AVIATION WEEK

NOV. 15, 1948

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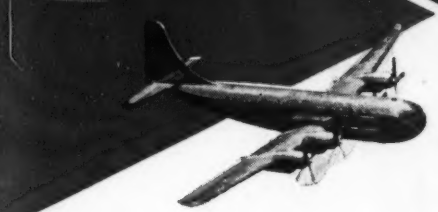

Inside Story

of Stratocruiser's Range

One of the secrets of the Stratocruiser's amazing 4,200-mile range is 35 Pliocel fuel tanks in the giant wings. Pliocels are made by Goodyear of specially treated gas-tight nylon fabric. They weigh only .080 lb./sq. ft.—outlast heavier metal tanks—fit any size or space—provide maximum gas capacity—minimum weight. For the full story of Goodyear Pliocels, write: Goodyear, Aviation Products Division, Akron 16, Ohio or Los Angeles 54, Cal.

Pliocel—T.M. The Goodyear Tire & Rubber Company

GOODYEAR AVIATION PRODUCTS

MORE AIRCRAFT LAND ON GOODYEAR TIRES, TUBES, WHEELS AND BRAKES THAN ON ANY OTHER KIND

The FUEL GAGE that *Always* works...

Check these features with all other fuel gages

Now FITS ALL PLANES

- The new Honeywell Fuel Gage gives a choice of flange-mounted or *new internally-mounted* tank units to permit use with any type of fuel tank, including integral tanks.
- Low-level warning switch is positive in operation. Can be set for high-level action.
- Indicator is trouble-free because it's MOTORIZED.
- Three-wire measuring circuit eliminates effects of moisture and temperature.
- Indicator is available in three dial diameters.
- Indicator pointer does not dance. Holds position when electrical power fails.
- Power-unit employs fungus-proofed hermetically-sealed transformers and R-C "cans."
- Vacuum tubes are of special "ruggedized" control type.
- Power Unit has push-button test switch for checking operation in flight.
- Changing vacuum tubes does not affect calibration or accuracy.
- Shock mounted power unit plugs in for easy maintenance.
- The extreme accuracy of the system is not affected by normal variations of voltage and frequency.
- Performance is independent of cable length.
- System is easily calibrated with or without fuel in the tanks, and calibration does not drift.
- New light-weight Honeywell cable connectors are fuel- and moisture-proof.

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CREATIVE ENGINEERING

MINNEAPOLIS Honeywell

AERONAUTICAL CONTROLS

How not to cook a pilot...

Take another look at the graph below!

It shows a new barrier to supersonic flight—the terrifically high temperatures created by air friction at high speed.

Cockpits in today's high-speed, high-flying planes would become man-size pressure cookers if it were not for the air expansion cooling turbine, developed and manufactured by AiResearch. One of these compact refrigeration units, weighing less than 16 pounds, can drop the temperature of air passing through it more than 500 degrees F.

Such AiResearch equipment is now in service on the majority of high-speed planes, including the Lockheed F-80, Republic F-84 and North American F-86.

● To you—whatever your field—this specialized experience on compact turbines and compressors is now available. AiResearch engineers—designers of rotors operating in excess of 100,000 r.p.m.—also invite your toughest problems involving high-speed wheels; actuators with high-speed rotors; air, gas and fluid heat exchangers; air pressure, temperature and other automatic controls.

Write: AiResearch Manufacturing Co.
Los Angeles 45, California

AiResearch
DIVISION OF
THE GARRETT CORPORATION

CREATIVE ENGINEERING

WHITE LINES altitude
LIGHT BLACK LINES speed
HEAVY BLACK LINES temperature

As the Navy-Douglas *Skystreak* (lower plane on chart) set a world speed record of 650.6 m.p.h., it was calculated that cockpit temperatures (caused by ram air and other factors) would have exceeded 180° F. without its AiResearch equipment.

AXELSON FIRST CHOICE

TOP FLIGHT

AVIATION EXECUTIVES AGREE

that Axelson engineering and plant facilities for the production of high precision aircraft components are among the finest available.

FOR PRECISION AIRCRAFT PARTS

such as landing gears, hydraulic struts, hydraulic actuators, gear boxes, transmissions, superchargers and variable speed drives, alternator drives and pressure regulator valves, Axelson is considered first choice by world leaders in aircraft manufacture.

Axelson is currently producing superchargers for cabin pressurization of the Douglas DC-6 airplane. Numerous Axelson experimental projects are under way, in design stage, production stage and on actual operating tests. Axelson engineering maintains constant research to provide more efficient equipment, combining economy with finest quality.

AXELSON
MANUFACTURING COMPANY

AIRCRAFT DIVISION

6160 South Boyle Ave.
Los Angeles 11, Cal.

Vol. 49, No. 20

AVIATION WEEK

November 15, 1948

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Aviation Week is indexed in "Reader's Guide to Periodical Literature", "Engineering Index" and "Industrial Arts Index." Publications combined with AVIATION WEEK are: AVIATION, AVIATION NEWS, AIR TRANSPORT, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL.

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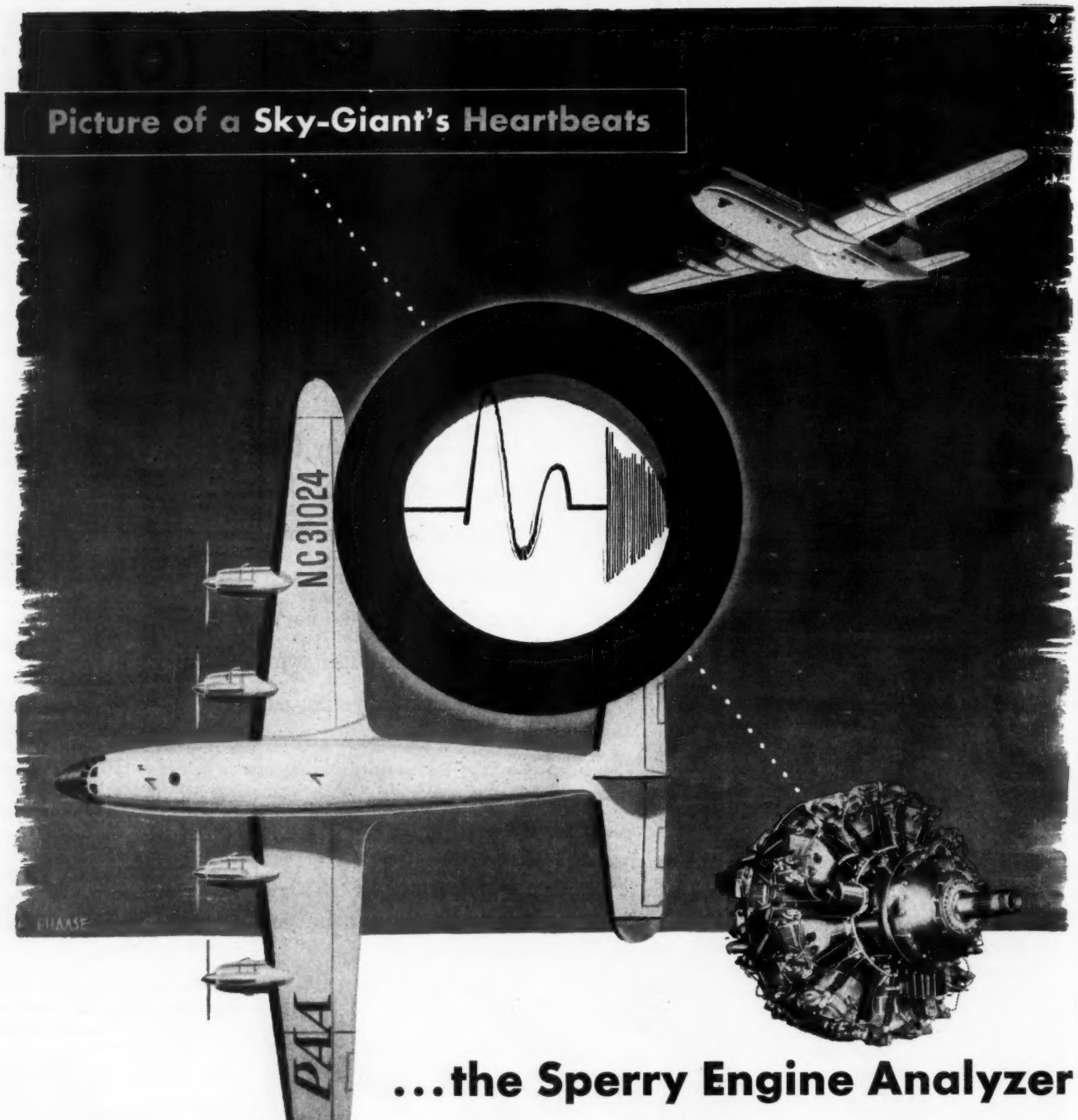
The 60-page Esso Refueling Guide shown below is typical of the thorough-going methods which help to maintain Esso standards of service at the Esso winged oval sign. The manual provides Esso aviation servicing personnel with exact directions—in clear text and diagram—for handling Esso Aviation Products, for fueling procedures and for insuring safety.

ESSO AVIATION PRODUCTS

ESSO EXPORT CORPORATION, AVIATION DEPARTMENT, 25 BROAD STREET, NEW YORK 4, N. Y.

Picture of a Sky-Giant's Heartbeats



...the Sperry Engine Analyzer

➢ High over the Atlantic and Pacific, the engines of Pan American's giant Stratocruiser and Constellation-type Clippers* will have every piston beat constantly checked by the Sperry Engine Analyzer. The first airline to install the Engine Analyzer, Pan American is confident it will open up "a new era in airline maintenance," eliminating up to 60% of delays caused by power plant troubles.

➢ The Flight Engineer uses the Engine Analyzer to keep his eye on the operation of his engines . . . immediately visualizing any irregularity in engine performance. Should trouble develop, graph-like patterns on the Analyzer scope spot its location and nature at once, precisely enough to isolate one spark plug from among the Stratocruiser's 224 or the Constellation's 144.

➢ Arriving at his destination, the Flight Engineer can give the ground crew a specific list of maintenance items, many times eliminating hours of trial-and-error trouble-shooting. This reduction in maintenance time will make possible tighter departure schedules, less over-all passenger transit time.

➢ Sperry's Engine Analyzer is the first complete instrument provided for commercial aircraft to isolate detailed engine difficulties. Now in full production for airline use, the Engine Analyzer takes its place beside the many other Sperry products designed to aid commercial aviation.

*TRADEMARK, PAN AMERICAN AIRWAYS, INC.

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New Prospects on Capitol Hill

There will be smoother sailing, less wrangling, on aviation matters in official Washington after the turn of the year. A Democratic Congress will take over to work hand-in-hand with the Democratic administration. Policy tiffs among Democrats—on Capitol Hill and in the executive aviation agencies—can be expected. But they will lack the vigor of politically-colored rows. The inclination will be to compromise differences within the Democratic family. Congressional Republicans will become minority voices. But, on issues on which there is cleavage in the Democratic ranks, they may be the deciding voices.

The situation as it appears now:

USAF Program

The Democratic family spirit in Washington might affect the 70-Group Air Force program. When the administration said "no" to the first step toward the program this year, GOP political leaders came out with an emphatic "yes". Congressional Democrats supported the program. But if the administration next year again says "no" to the program, the Democratic Congress will listen attentively to its arguments. These are:

(1) The maximum expenditure for national defense that can be supported by tax revenues during the coming fiscal year is $15 billion. Under Defense Secretary James Forrestal's policy for the three services, USAF's allocation is insufficient for the second step toward a 70-Group program. Cracking the $15 billion ceiling to provide additional USAF funds would leave Democrats with a budget deficit to explain—or remedy. The remedies would be politically costly—cutting back popular public works and social programs, or promoting tax-boost legislation to increase government income.

(2) Adding a national defense burden exceeding $15 billion to a booming economy, already hard-pressed to meet foreign and domestic demands, would mean reversion to rigid wartime controls. Democrats learned the popular reaction to controls in the 1946 election. Forrestal has estimated a 70-Group USAF would mean an over-all national defense program of $18 billion (his latest estimate) to $30 billion. This is under his policy of literally giving Army and Navy a dollar each for each dollar added to USAF's budget.

Congress likely will not make any material cuts in the administration's $15 billion defense program, in the face of the high-tension international situation. This will probably provide for a slight acceleration in the Navy's current-year $1.5 billion program. Navy plans for a greatly-accelerated program do not have the Congressional support that a big USAF has.

There are confirmed proponents of the 70-Group USAF among top Democrats in Congress, prepared to risk its consequences: Rep. Carl Vinson (D., Ga.), slated to become chairman of the House Armed Services Committee, and most of his committee members; Sen. Lister Hill (D., Ala.) and Sen. Burnet Maybank (D., S. C.), members of Senate Armed Services Committee: Rep. Lyndon Johnson (D., Tex.), Senator-elect; and others. But the final decision will probably rest with party leaders, who have one eye fixed on the program's political repercussions.

Best hope for the 70-Group USAF lies in Forrestal's replacement—expected soon—with an air-minded Secretary who would re-allocate the $15 billion defense budget, earmarking sufficient funds for the USAF program. The three leading contenders for Forrestal's post are not likely to do so. They are: Army Secretary Kenneth Royall, Navy Secretary John L. Sullivan, financier Ferdinand Eberstadt. Navy partisan Eberstadt, now working out armed services reorganization for the Hoover Commission, lustily fought co-equal status for USAF with the Army and Navy.

A fourth prospect, former Interior Secretary Harold Ickes, is a question mark as far as military policy goes. His punchy campaigning for Truman out West may be rewarded with this post. Strong-willed, unawed by brass or little else, Ickes is favored as the-most-likely-to-succeed in accomplishing unification of the "unified" services.

Democratic-controlled Civil Aeronautics Board, and Civil Aeronautics Administration, an arm of the Democratic administration, will deal with a friendly Democratic Congress next year—instead of the skeptical GOP Congress of the past two years, which set up its own aviation policy board to make its own survey of aviation problems. The Democratic Congress will look to CAA and CAB to take the lead in establishing policy. Most CAA- and CAB-sponsored bills will zip through the legislative branch.

Administration Policy

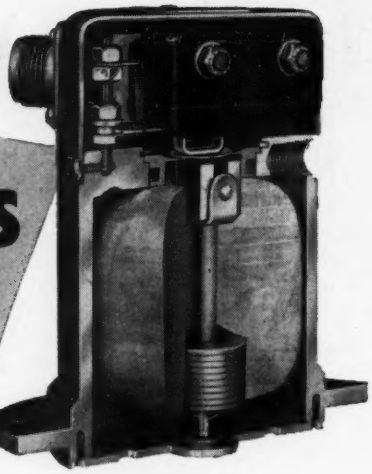
Controversial moves, directed against administration commercial aviation policies, can be expected to get nowhere. The administration's regulated competition program for overseas aviation will move ahead with little, if any, Congressional interference. Chosen instrument proponents count for a showdown in 1952 when seven-year North Atlantic route certificates expire. It may come—if Republicans sweep back into power in Congress in the next election. GOP plans to investigate CAB and the airlines will be dropped by next year's Democratic Congress. Investigators of Sen. Homer Ferguson's (R., Mich.) Senate Investigating subcommittee have been looking for evidence of political influence in CAB decisions and data on airline subsidies for almost a year. The subcommittee has little time in which to spotlight whatever it has unearthed at public hearings before it switches to Democratic control in January.

President Truman has informed Congressional Democrats that he would veto legislation opening the airline field to steamship companies. Democrats favorable to the proposition see no point in pushing it. Sea-Air Committee, with Washington attorney Robert Kline at the helm, is set to continue its drive, however.

The Democratic family spirit in Washington next year will not eliminate wrangling over two major commercial aviation issues: Regulation of contract carriers and reorganization of CAA and CAB. These are intra-family fights. CAA and CAB are split on both matters. Democrats in Congress, also divided, will have to decide between CAB's recommendation for rigid economic regulation of contract carriers and CAA and Commerce Department opposition. The desirability for re-alignment of functions has been conceded on all sides, but CAA and CAB have been at odds on all reorganization proposals.

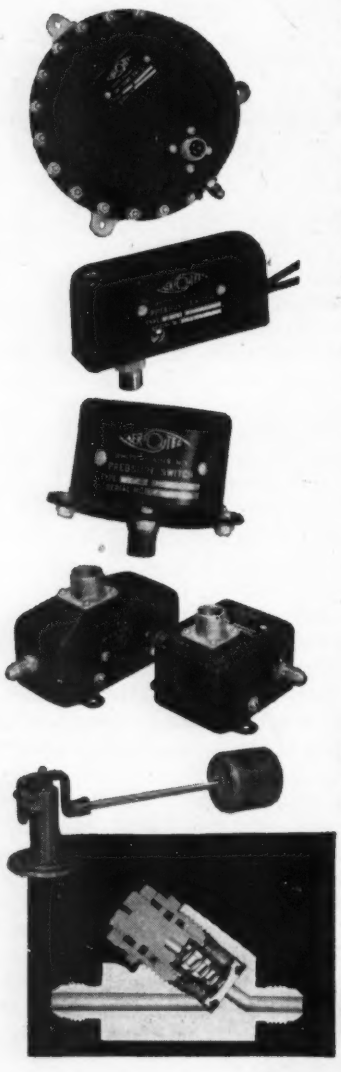
Another fight is still on over separation of service and subsidy mail payments to airlines. Pushed this year by Republicans, this proposal has the support of Democrats on the House and Senate Appropriations Committees. With some hesitancy, Postmaster General Jesse Donaldson endorsed it at a Congressional hearing. Sea-Air Committee will push the proposition—which Air Transport Association claims is aimed at making the airlines targets of unfavorable publicity.

Cut away section of Aerotec Sealed Float Switch. Switch is actuated by Alnico Magnet through Beryllium Copper Seal.



CONTROLS BY AEROTEC

. . . specifically designed for Military Aircraft . . .



Thousands of Aerotec Switches, Controls and Valves served on fighters, bombers and other types of military aircraft during the war.

With the cessation of hostilities, these controls were modified to the needs of commercial aircraft and, in some cases, even to industrial uses.

The quality, in design and engineering, of Aerotec Switches has not changed, it is an accepted fact both by the Army-Navy and manufacturers of commercial planes. The same care that gave these controls outstanding performance records in combat, is used in the manufacture of Aerotec equipment today.

A list of Aerotec equipment will be convincing:

Aerotec PRESSURE SWITCHES
Bellows type (controls manifold water injection).
Fuel pressure.
Altitude and Flow Indicators.

Aerotec SENSITIVE PRESSURE SWITCHES
Ultra Sensitive Switch (1/100″ W.G. differential)
Ram Air Pressure Switch (for Air Speed Indication)

Aerotec VALVES . . . for any liquid application that will not corrode brass.
Float Valves
Pressure and Vacuum Relief Valves
Vent Valves
Reducing Valves

Built to Army-Navy standards, these Controls, Switches and Valves are now being installed on many of the latest type planes . . . a tribute to the continuing research and development of the control division of the Aerotec Corporation.

For information on these instruments, contact our Field Engineer in your territory, or write us direct.

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AVIATION CALENDAR

Nov. 13-16—American Society for Testing Materials, petroleum products and lubricants, Drake Hotel, Chicago.

Nov. 15-16—Public relations advisory committee, Aircraft Industries Association, eastern section, Allison plant, Indianapolis. Co-host is Wright Field.

Nov. 15-17—Aviation Distributors and Manufacturers Assn., sixth annual meeting, Hotel Statler, Cleveland.

Nov. 15-17—National Aviation Trades Assn., annual meeting, Allerton Hotel, Cleveland.

Nov. 16—Aircraft Industries Assn., ATC panel meeting on AN-D-12A, Van Cleve Hotel, Dayton, Ohio.

Nov. 16-17—American Society for Testing Materials, plastics, Atlantic City, N. J.

Nov. 16-18—National Association of Travel Officials, Miami Beach, Fla.

Nov. 17-18—Aircraft Industries Assn., Air Force-Navy-Industry (ATC) meeting on AN-D-12A, Wright-Patterson Air Force Base, Dayton, Ohio.

Nov. 17-19—American Society for Testing Materials, electrical insulating materials, New York City.

Nov. 18-19—American Society for Testing Materials, structural sandwich materials, Philadelphia.

Nov. 23—ICAO southeast Asia regional air-navigation meeting, New Delhi.

Nov. 28-Dec. 3—American Society of Mechanical Engineers, annual meeting, Hotel Pennsylvania, New York City.

Dec. 1-2—Aircraft Industries Assn., Air Force-Navy-Industry (ATC) meeting on accessory oil seals, Washington, D. C.

Dec. 2-5—Annual meeting of the Society for Experimental Stress Analysis, Hotel Commodore, New York City.

Dec. 2-5—Fourth annual international aviation celebration, El Paso.

Dec. 3—Meeting on magnesium, sponsored by Magnesium Assn. and Mellon Institute, Mellon Institute auditorium, Pittsburgh.

Dec. 3—American Helicopter Society, Inc., annual dinner and presentation of honorary fellowships, Hotel New Yorker, New York City.

Dec. 14-15—Aircraft Industries Assn., Air Force-Navy-Industry meeting on accessory drive requirements, Power Plant Lab., Wright-Patterson Air Force Base, Dayton, Ohio.

Dec. 17—Annual Wright Brothers Lecture, Institute of the Aeronautical Sciences, U. S. Chamber of Commerce Bldg., Washington, D. C.

Jan. 5, 1949—Florida Flying Alligator Club, 14th annual reunion, Melbourne, Fla.

Jan. 10-14—Society of Automotive Engineers, Annual Meeting and Engineering Display, Hotel Book-Cadillac, Detroit, Mich.

Jan. 11—ICAO Communications Division, Montreal.

Jan. 13-14—Fourth NAS Council Meeting, AIA offices, Hollywood, Calif.

Jan. 24-27—IAS seventeenth annual meeting, Hotel Astor, New York City.

Jan. 27—Society of Automotive Engineers, metropolitan section, fuels and lubricants meeting, Engineering Societies Bldg., New York City.

Feb. 8—ICAO, Operations Division, Montreal.

Feb. 22—ICAO Airworthiness Division, Montreal.

Mar. 3—Society of Automotive Engineers, metropolitan section, air transport meeting, Engineering Societies Bldg., New York City.

July 3-4—First Annual Southern California International Air Race, Long Beach.

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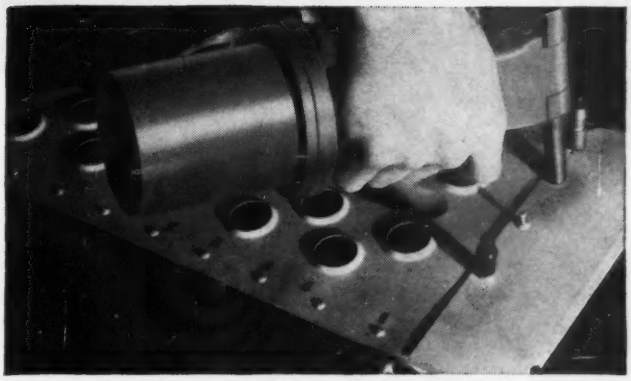
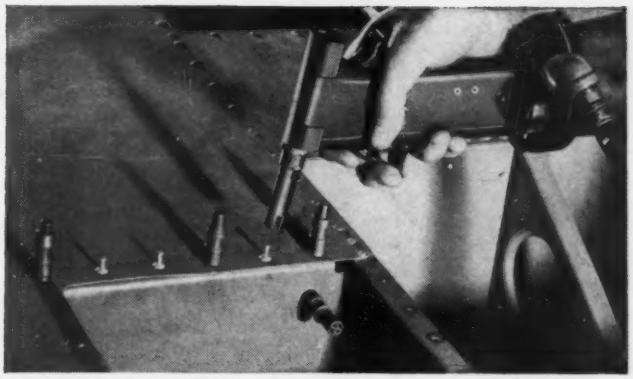
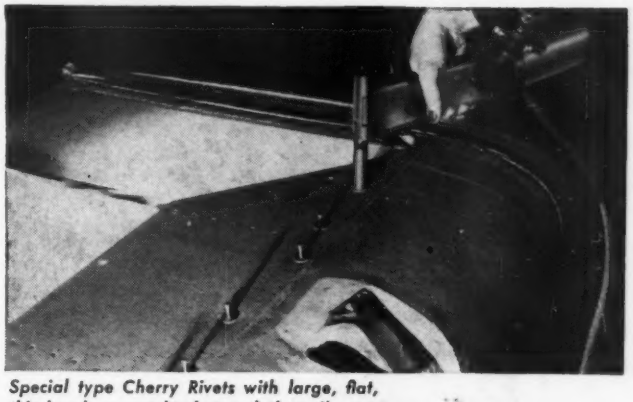


Sub-assembly being fastened to a tubular member with Cherry Blind Rivets at the Boeing Airplane Company, Seattle, Washington.



Cherry Self-plugging Blind Rivets securely fasten panels on B-50 bomb-bay doors.

Boeing fabricated chairs are assembled with Cherry Self-plugging Blind Rivets.



Special type Cherry Rivets with large, flat, thin heads are used to fasten cloth to ailerons.

CHERRY BLIND RIVETS ..... make the hard jobs easy

PRODUCTION IS SMOOTHER. Cherry Blind Rivets free production planning for difficult-to-reach blind spots in all types of assembly work. Fuselage, wing, tail group, and other aircraft assemblies are finished much faster with Cherry Rivets. Only one man is needed . . . There's no bucking with Cherry Rivets. Cherry Blind Riveting gives you a quicker fastening method fully adapted to production-line assembly work.

SPECIAL FASTENING CHARACTERISTICS GIVE YOU BETTER RESULTS. Cherry Rivets are designed with more shank expansion . . . that means tighter, vibration-free joints. They have greater hole-diameter and grip-length tolerances . . . that means more latitude for all types of assembly jobs. Cherry Rivets are available in *more* rivet types, *greater* range of diameters, and the greatest number of grip lengths.

COMPARABLE TO SOLID RIVETS. Cherry Self-plugging Rivets have shear values comparable to solid rivets. Excellent hole-filling qualities insure vibration-resistant joints. Cherry Rivets combine simplicity with strength . . . the simplicity of their fastening technique makes them a "standard" on aviation production lines. Try Cherry Rivets today and gain years of less-expensive, more efficient production assembly.

Cherry Rivets are made from aluminum alloy, steel, or Monel. Standard rivets come in five diameters and two head styles. There is a wide range of grip lengths. Special heads, diameters, grip lengths, and alloys can be made to order. WRITE US TODAY FOR FURTHER INFORMATION. BOOKLET MAILED ON REQUEST. ADDRESS DEPT. K-110, CHERRY RIVET COMPANY, 231 WINSTON STREET, LOS ANGELES 13, CALIFORNIA.

CHERRY RIVETS. THEIR MANUFACTURE & APPLICATION ARE COVERED BY U. S. PATENTS ISSUED & PENDING

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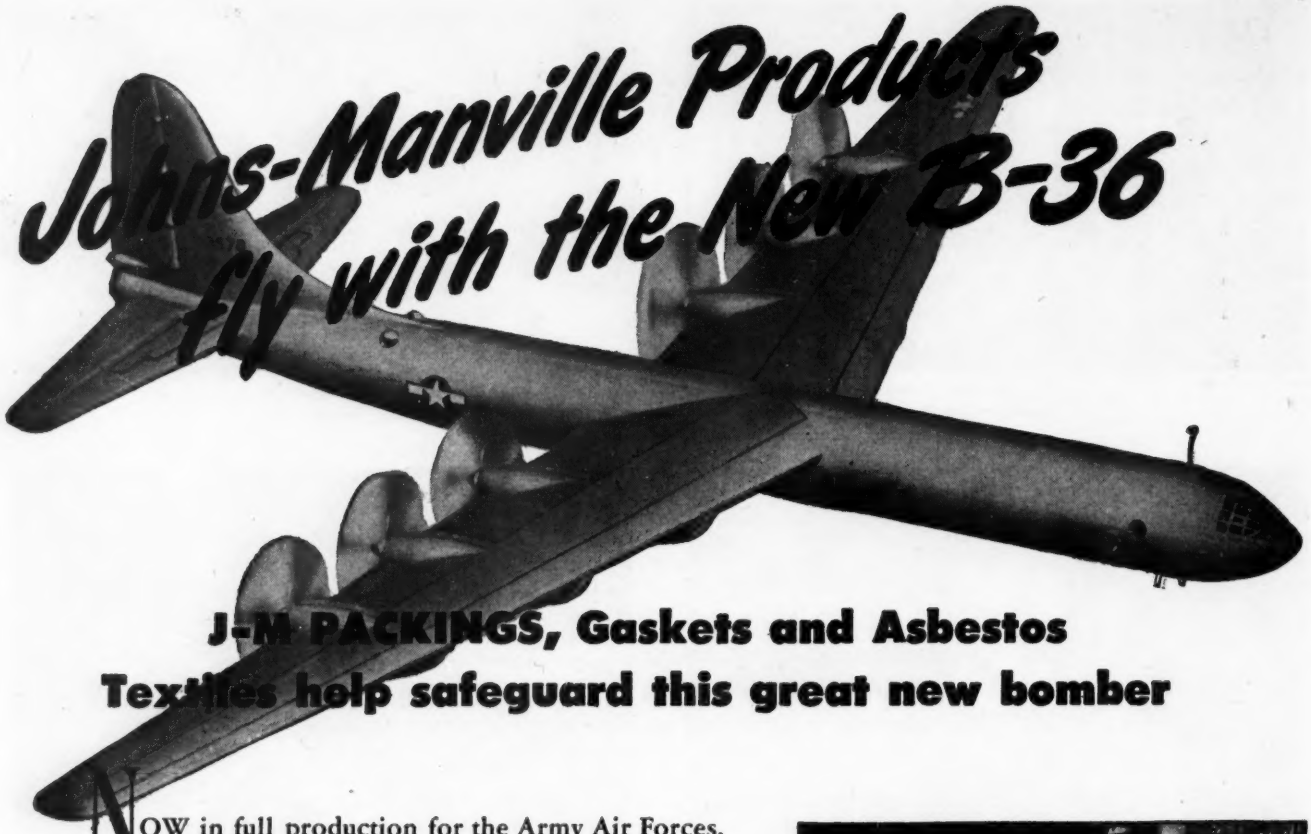
Johns-Manville Products fly with the New B-36



J-M PACKINGS, Gaskets and Asbestos Textiles help safeguard this great new bomber

NOW in full production for the Army Air Forces, the Consolidated Vultee B-36 is protected by a number of flight-tested Johns-Manville products.

Expansion joints in the exhaust manifold system are tightly sealed with Johns-Manville Inconel Packing. This resilient packing, developed especially for this type of severe service, effectively withstands the combination of extreme temperatures, unusual corrosive conditions and severe vibration which would quickly reduce an ordinary packing to ashes.

For sealing flanges on the anti-icing and cabin heating and pressurizing systems, Johns-Manville Gaskets of special design are used. These are made of tightly woven asbestos cloth coated on both sides with a flame-proof Neoprene compound.

And for such jobs as wrapping fuel lines and fireproofing other control lines within the engine shroud, fire and flame resistant J-M Asbestos Textiles in the form of woven tape and tubing find many uses in Convair's new super-bomber.

Brochure AV-1A gives complete information about these and other Johns-Manville products for the aviation industry. For your copy, address Johns-Manville, Box 290, New York 16, N. Y.

Inconel Packing installation in slip joint just aft of heat exchanger in B-36.

J-M No. 95 Neoprene-Asbestos Sheet Packing installation in fire wall of B-36 nacelle.

—Johns-Manville—

J-M PRODUCTS FOR THE AVIATION INDUSTRY

Packings and Gaskets • Friction Materials
Insulations • Asbestos Textiles • Transite Conduit
Transite Pipe • Industrial Building Materials

NEWS DIGEST

DOMESTIC

USAF XR-12 crashed into Choctawhatchee Bay, near Elgin Field, Fla. The four-engine, high speed photo-reconnaissance plane, built by Republic Aviation Corp., recently completed a coast-to-coast high altitude photo mission and was the only plane of its kind in Air Force service. The other XR-12 is still at Republic's plant undergoing repairs of damage suffered when the gear collapsed on a landing some months ago.

Deering Howe, president of Transair, Inc., nonscheduled passenger and cargo line, died in Havana after a heart attack. He was 48 years old. He was a director and official of banking, trading and industrial firms.

Bennett E. Meyers' conviction for subornation of perjury was upheld by U. S. Court of Appeals. The former Air Force major general, now in the District of Columbia jail, has only one more recourse from his 20 month to five year sentence: The U. S. Supreme Court.

Cornerstone was laid for first permanent building at New York International Airport (Idlewild). The three-story, $4,500,000 building will be completed by spring and house Civil Aeronautics Administration and Weather Bureau offices.

Aircraft Industries Assn. has issued its annual listing of performance specifications for U. S. civil aircraft, covering 55 types, including 35 personal models, 16 transport, cargo or executive, and four helicopters.

FINANCIAL

Boeing Airplane Co. reports loss of $298,820 for nine months ended Sept. 30. Indicated third-quarter profit of $775,690 (which sliced down $1,074,510 loss reported at mid-year) is due to upward revision of prices on military contracts. Nine-month sales were $71,404,956. Sept. 30 backlog was $327,051,000.

FOREIGN

Sweden's A.B.A. airline has sold four undelivered Douglas DC-6 sleepers to Australia for use on the government-operated trans-Pacific routes.

Bahamas Airways Ltd. has been bought by British South American Airways. Bahamas Airways operates scheduled service from Nassau to other cities in the Islands.

Great Britain has exported 174 jet engines to Russia and other countries not included in the five western European nations, Minister of Supply G. R. Strauss told the House of Commons.

INDUSTRY OBSERVER

► Don't be surprised if the Boeing XB-55, now designed for turboprops, finally turns up with turbojet power. USAF engineers rejected four turbojet designs submitted by other aircraft manufacturers to give the medium bomber award to Boeing's turboprop design mainly because they were skeptical of the range offered by turbojets. Rapid technical progress on turbojets is improving the range picture and discussions are underway on changing the XB-55 to turbojets. Manufacturers who originally submitted turbojet designs will be bitter if the USAF orders the XB-55 change without another design competition.

► Revived Navy interest in airborne logistics will mean new life for the Glenn L. Martin Co. Mars project. Under current proposals Martin will re-establish its production line for the giant flying boat transports as a pilot line geared to produce three or four Mars a year and capable of expanded emergency output. Mars airframe can take more powerful powerplants including the Curtiss-Wright compound engine (Turbo-Cyclone 18) with increased gross weights and payload. JRM-2 is now flying between San Francisco and Hawaii with a 36,000 lb. payload. Using C-W compound engines the Mars gross could be boosted to 170,000 lb. with a 48,000 lb. payload.

► Britain has two new jet bomber projects in the mill. Armstrong Whitworth, which was conducting extensive research on tailless aircraft, are working on an eight jet flying wing type bomber roughly similar to Northrop's YB-49. Handley-Page has a design for a four jet swept-wing tailless bomber now in the model stage.

► Glen McCarthy, wealthy Texas oilman, hotel owner and movie producer, is exploring the possibilities of organizing an annual major aviation show in Houston, Texas. McCarthy sponsored three of the four first place Bendix racers in last year's National Air Races and plans to build his Houston enterprise around a combination of racing, military air demonstrations and an international gathering of aviation policy makers on the pattern of the National Aviation Clinic.

► Northrop RB-49 photo-reconnaissance flying wings may be powered by the huge Northrop turbodyne 10,000 hp. turboprop engines. J. K. Northrop referred to this combination in his Library of Congress address and stated it would enable the wing to cruise at 500 mph. Most likely powerplant is a combination of both turbodyne turboprops and straight turbojet engines, the latter shut down for long-range cruising and used only for takeoff and high speed flight.

► Fairchild Camera and Instrument Corp. is developing a new "strike-attack" camera for Tactical Air Force to record bomb damage done by fast, low-flying fighters and light bombers. The new camera will take 70 mm. pictures at the rate of five per second using shutter speeds up to 1/2500 second.

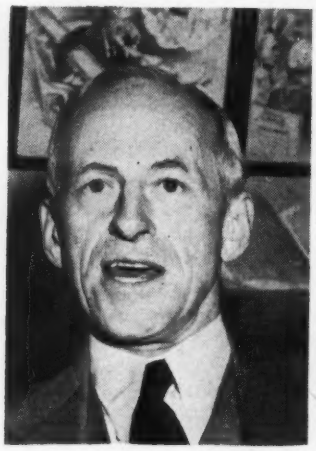
► Consolidated Vultee's Convair-Liner now is flying with two-foot extensions attached to engine jet thrust augmentor exhaust tubes. The extension is said to give satisfactory modification of the "jet rumble" previously annoying to passengers occupying seats at the rear section of the cabin. Tube extension kits are being prepared for 76 Convair-Liners already delivered.

► Apparently abandoned is Consolidated Vultee's use of exhaust gas bleed for anti-ice heating of the Convair-Liner wing and tail structures. Areas now are being heated by a thermal muff wrapped around augmentor exhaust tubes. This system has gained a temporary CAA approval, and probably will have full certification following icing flights now under way. CAA objected to exhaust gas wing heating because of structural corrosion risks and the smudging of the inner wing by exhaust carbon, making inspection of affected structures difficult.

Vol. 49, No. 20

AVIATION WEEK

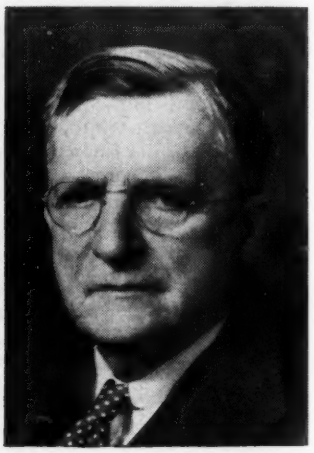
Nov. 15, 1948



Sen. Millard Tydings

Sen. Edwin Johnson

Rep. Carl Vinson



Rep. Alfred Bulwinkle

New Aviation Lineup In 81st Congress

In Senate, key men will be Johnson and Tydings. In House, Bulwinkle and Vinson.

Aviation interests will have a new slate of congressional personalities to deal with in January.

Republicans who headed key aviation committees in the House and Senate during the past two years will surrender their posts to Democrats. Committee staff assistants will make way for Democratic appointees. Democrats, instead of Republicans, will be in the majority on every committee of Congress. This means that any legislation will have to be Democratic-sponsored to progress.

▶ **Republicans in Background**—Maine's Sen. Owen Brewster, South Dakota's Sen. Chan Gurney, Massachusetts' Sen. Henry Cabot Lodge, California's Rep. Carl Hinshaw, Nebraska's Rep. Karl Stefan and other Republicans who have steered aviation legislation over the past two years will officially step into the background. Because of their knowledge of aviation problems, most of which are non-partisan, they will remain potent voices. But they will be in the minority.

Sen. Edwin Johnson (D., Colo.) is slated to take over chairmanship of Senate Interstate and Foreign Commerce Committee, which handles all civil aviation legislation, from Sen. Wallace White (R., Me.). White delegated his powers—on aviation—to Sen. Owen Brewster. Johnson will not. A member of the former Congressional Aviation Policy Board, Johnson has been active on aviation matters and is likely to appoint himself chairman of Interstate's Aviation subcommittee.

▶ **Other Prospects**—If he does not, there are three prospects for the post: Sen. Ernest McFarland (D., Ariz.), Sen. Warren Magnuson (D., Wash.), and Sen. Brien McMahon (D., Conn). Although a member of the Aviation Policy Board, McFarland lacks aviation background and interest. Magnuson is probably the best informed, but his widely publicized stockholdings in Northwest Airlines rule against his appointment. McMahon's responsibilities as chairman of the Congressional Atomic Energy Committee might preclude his appointment.

In addition, McMahon's support of chosen instrument legislation set him at odds with Johnson, who led the opposition to the proposition in the last Congress. There will be at least two new Democrats named to Senate Interstate next year to make a majority.

▶ **Brewster Out?**—Aviation circles are speculating that Johnson will not name Brewster to Interstate's Aviation subcommittee. The two clashed bitterly over the chosen instrument proposal sponsored by Brewster, and are personally antagonistic.

On the GOP side of Senate Interstate, the lineup next year, in order of rank, will be Charles Tobey (R., N. H.), Clyde Reed (R., Kans.), Brewster, Homer Capehart (R., Ind.). Reed has been active in promoting air mail rate increases and is generally considered a railroad spokesman.

Three GOP committee members did not seek re-election: White, Sen. Albert Hawkes (N. J.), Sen. Ed Moore (Okla.).

Hawkes' opposition killed off the chosen instrument bill in committee. He also served on the aviation policy board. Moore is well remembered for his unsuccessful fight to block confirmation of the CAB nomination of Josh Lee, his predecessor in the Senate.

▶ **Bulwinkle Ascends**—Chairmanship of House Interstate and Foreign Commerce Committee will shift from Rep. Charles Wolverton (R., N. J.) to Rep. Robert Crosser (D., Ohio). Aviation leadership in the group will go from Rep. Carl Hinshaw (R., Calif.) to Rep. Alfred Bulwinkle (D., N. C.). Bulwinkle and Hinshaw have seen eye-to-eye on all aviation problems coming before the committee, so the shift, policy-wise, will not be serious. Both have been sympathetic to the airline position.

Top Democrats on next year's House Interstate and Foreign Commerce Committee, after Crosser and Bulwinkle, in order of rank: Lindley Beckworth (Tex.), Percy Priest (Tenn.), Oren Harris (Ark.). On the Republican side, the top figures, after Wolverton and Hinshaw: Reps. Leonard Hall (N. Y.), Joseph O'Hara (Minn.), Wilson Gillette (Pa.), and Robert Hale (Me.).

▶ **Military Aviation**—Sen. Chan Gurney (R., S. D.) will turn over chairmanship of Senate Armed Services Committee to Sen. Millard Tydings (D., Md.).

Chairmanship of House Armed Services Committee will go from unaggressive Rep. Walter Andrews (R., N. Y.) to aggressive Rep. Carl Vinson (D., Ga.), who pretty much called the tune in the committee this year, although not its chairman.

Tydings was a member of the former Senate Naval Affairs Committee and Vinson was chairman of the former House Naval Affairs Committee. Both sponsored the Navy cause in fighting the 1946 Unification Act. This year, Vinson championed the 70-Group Air Force program, over Navy opposition. Tydings also supported the 70-Group program.

▶ **Democrats Listed**—Democrats on next year's Senate Armed Services Committee, in order of rank: Richard Russell (Ga.), Harry Byrd (Va.), Lister Hill (Ala.), Harley Kilgore (W. Va.), Burnet Maybank (S. C.). Russell and Byrd, for economy reasons, have been cool toward a 70-Group Air Force. Hill and Maybank have backed it strongly. Leading candidates for the Democratic vacancy on the committee are Magnuson and Rep. Lyndon Johnson (D., Tex.), Senator-elect. Both were active members of the former House Naval Affairs Committee, and Johnson this year was a member of House Armed Services Committee.

On the Republican side, ranking members will be Gurney, Styles Bridges (N. H.), Leverett Saltonstall (Mass.), Wayne Morse (Ore.), Raymond Baldwin (Conn.). Two high-ranking GOP members of the committee were wiped out in the election: Sen. George Wilson (Ia.), who was inactive, and Sen. Edward Robertson (Wyo.), who has been the Navy's leading spokesman.

▶ **House Committee**—On the House Armed Services Committee, Rep. Overton Brooks (D., La.), son-in-law of the late Sen. John Overton, will become second ranking majority member, and Rep. Paul Kilday (D., Tex.), a member of the aviation policy board, third-ranking member. Brooks not only backed Vinson's fight for a 70-Group Air Force program in the last Congress, but opposed trimming the appropriation for it from $922,000,000 to $822,000,000.

Chairmanship of Senate Appropriations Committee will go from Sen. Styles Bridges (R., N. H.) to Sen. Kenneth McKellar (D., Tenn.). Chairmanship of House Appropriations Committee will switch from Rep. John Taber (R., N. Y.) to Rep. Clarence Cannon (D., Mo.).

▶ **Senate Key Men**—On the Senate side, leadership on military appropriations will rest with Tydings and Russell, topnotchers on the Armed Services Committee, as well as the Appropriations Committee. Sen. Elmer Thomas (D., Okla.), however, has an edge for the chairmanship of the Military Appropriations subcommittee. In the last Democratic-controlled Congress he was chairman of the Army Appropriations subcommittee.

On the House side, chairmanship of the Military Appropriations subcommittee will probably go to either Rep. John Kerr (D., N. C.) or Rep. Harry Sheppard (D., Calif.). In the last Democratic Congress, Kerr headed the Army Appropriations subcommittee and Sheppard, the Navy Appropriations subcommittee.

▶ **McCarran's Post**—Sen. Pat McCarran (D., Nev.), one of the most active members of Congress on civil aviation matters (he was forced to surrender a spot on Senate Interstate and Foreign Commerce Committee by the Congressional Reorganization Act limiting membership to two committees), is slated to become chairman of the Senate Appropriations subcommittee on Commerce Department, passing on Civil Aeronautics Administration and Civil Aeronautics Board budgets. McCarran can be counted on to wield substantial influence over commercial aviation developments through his purse-string control post.

ALPA Convention

Air Line Pilots Association expected to hold the largest convention in its history at Chicago last week with 170 delegates from 85 local ALPA councils representing pilots of 29 carriers.

President David L. Behncke said about 50 percent of the convention's time would be devoted to a study of air safety and methods of fostering its improvement. In addition, a president, first vice president, secretary, treasurer and 16 regional vice presidents will be elected for two-year terms.

Founded in 1930 and chartered in 1931, ALPA says its present membership stands at 6325 and includes 97 percent of the nation's scheduled airline pilots. ALPA states it represents pilots of these carriers: Alaska Airlines, American, American Overseas, Braniff, Chicago & Southern, Colonial, Continental, Delta, Eastern, Empire, Mid-Continent, Monarch, Florida, National, Northeast, Northwest, Pan American, Panagra, Pioneer, Capital, TWA, United, Western, West Coast, Hawaiian, Challenger and Trans-Texas.

NAVY'S BIGGEST CARRIER PLANE IN TAKEOFF

Navy added strength to its "big carrier" campaign recently by booting two Lockheed P2V Neptunes off the deck of the carrier Coral Sea, lying off the Virginia Capes. It was the largest aircraft to leave a carrier's deck to date. When Commander T. D. Davies, famed for his command of the "Truculent Turtle" long-range flight, uncorked eight JATO bottles strapped to the fuselage of his P2V the plane was airborne after a half-deck run. No attempt was made to recover the planes.

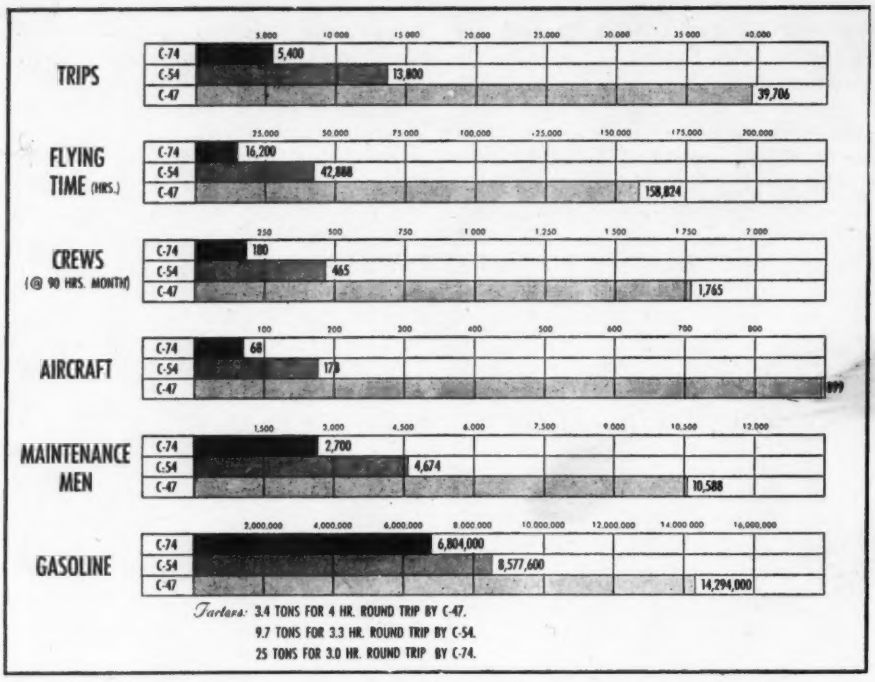


Chart shows monthly needs to maintain 4500-ton daily lift into Berlin.

Airlift Prepares for Bad Weather

Most winter flights must be made on instruments; new field and navigation aids added to Berlin facilities.

The Allied airlift to Berlin has moved into the critical winter weather phase.

U. S. Air Force long range weather forecasts indicate that instrument flight will be necessary for more than two-thirds of November-February period in the Berlin-Frankfurt area.

▶**Bad Weather Period**—As of last week the airlift had deposited 465,584 tons of cargo in Berlin. Of this total 314,594 tons were flown by USAF planes with the Royal Air Force delivering some 141,000 tons. During October the Allied airlift averaged delivery of 3766 tons daily to Berlin. During the first week of November during which bad weather predominated, deliveries slumped to a 2700 ton daily average. For a 12-day period of unbroken instrument weather from Oct. 23-Nov. 5 the airlift averaged 3150 tons daily to Berlin.

Battening down for the winter grind found the airlift using new tactics to boost its all-weather flying record. Winterization of the airlift planes was nearing completion at bases in western Germany including switch to cold-weather hydraulic fluids and lubricants and installation of deicing equipment.

▶**High Intensity Lights**—At Templehof a special set of 40 AGA high intensity approach lights was being installed to mark a 300 ft. approach lane to the instrument landing runway. These lights will reduce daytime visibility minimums to one eighth of a mile. The latest type of military GCA is now in operation at Templehof permitting handling of two planes at a time on final approach. New VHF two course ranges that are static free during bad weather have replaced the low frequency four course ranges in the air corridor to Berlin.

The newly-constructed Tegel airfield opened its 6000 ft. runway for operations last week to augment the capacity of Templehof and Gatow fields in the Allied sectors of Berlin.

▶**More Planes**—Meanwhile both USAF and RAF were moving additional equipment to boost the airlift. British added eight Handley-Page Hastings transports to its airlift contingent last week. The Hastings has a 10-ton payload. First of 24 Navy C-54s went into service on the USAF lift last week. The Navy contingent taken from Military Air Transport Service consists of VR-6 formerly operating from Honolulu and VR-8 formerly flying from Guam to Asia. The two Navy squadrons were replaced in MATS by a Marine transport squadron (VMR-352) equipped with C-54s to operate Pacific routes. Navy is increasing personnel of its transports squadrons operating on the direct Frankfurt-Berlin shuttle and on the North Atlantic support run to full war strength and transferring aviation personnel from combat groups to support its airlift contingent.

▶**Need 41 C-54s**—The 24 Navy C-54s already committed to the airlift leave MATS with the job of finding an additional 41 C-54s to make up the 66 plane increase promised Gen. Clay during his October trip to Washington. Five Fairchild Packets (C-82) are continuing on the lift to move bulky freight.

MATS is flying two C-74 round trips across the Atlantic weekly in support of the airlift. Bulk of the seven C-74s now operating in MATS are still being used on Caribbean routes.

Small Firms Told To Get Arms Work

Robert P. Patterson, former Secretary of War, has told small business it should join the re-armament program for its own good (AVIATION WEEK, Nov. 1).

Patterson, who had been in charge of procurement when Undersecretary of War, warned that "if they neglect to do so, they are likely to find some of their existing markets impaired . . . and . . . will forfeit the advantage of this market for their products."

In a speech in New York before the National Conference of Commercial Receivable Companies, Inc., he pointed out that the huge sum of $15 billion to be spent for national defense "is bound to have an effect on our trade and commerce that we will not relish . . . and will . . . divert materials . . . from production of capital goods and consumer goods needed by our people." Bad as this is, "failure to re-arm would be infinitely worse."

▶**Industrial Drain**—He predicted that the drain on our industrial plant will be severe, causing many hard and disagreeable problems. The solution, he thinks, may involve allocations of materials, higher taxes and stricter controls on credit.

Patterson went on to describe the part Congress, the Munitions Board and the three services will take in the procurement setup. He emphasized that the "actual placing of contracts will be attended to by the three services." He is not in favor of a "super-duper" purchasing branch for the entire military establishment.

He recalled that purchase by advertised bidding was in many cases abandoned during the war because of the immediate need for certain materials. "Contracts made by informal bidding, or even across the table, were permitted."

Patterson assured the group that "small business will find the procuring branches in the Army, Navy and Air interested and cooperative. Advance payments will be available in proper cases and in permissible amounts." He hoped that "small business will not miss the bus, as so many of our smaller concerns did in the early 1940s."

Winter Service

ATA authority says weather will cause no major schedule breaks.

By Robert Hotz

Prediction that the airlines will complete the coming winter bad weather season without major schedule interruptions was made last week by Milton W. Arnold, Air Transport Association vice president for operations and engineering.

If Arnold's prediction is fulfilled it will be evidence of startling progress in airline operating techniques during the past two years. A previous ATA study has indicated that during 1946 the airlines lost nearly $40,000,000 due to flight delays and cancellations caused by bad weather.

▶ **Equipment Credited**—Arnold based his prediction on the use of very high frequency communications equipment; a VHF radio beam landing system (ILS) and search and precision beam radar (GCA); plus introduction of drastically revised traffic control procedures made possible by this equipment.

In remarks prepared for delivery at a New York press meeting, Arnold said that airline delays of all types had been reduced by about 50 percent during the first nine months of 1948. Delays due to weather have been cut 62 percent; servicing delays, 42 percent; cargo handling delays, 54 percent; and passenger handling delays, 54 percent.

▶ **LaGuardia's Statistics** — LaGuardia Field, which generates 12 percent of the nation's air traffic and is generally conceded to have the worst air traffic congestion problems, was cited by Arnold to illustrate the beneficial effect that new equipment and procedures are already having on operations. He pointed out that in the winter of 1946-47 87 percent of all airline schedules during instrument weather at LaGuardia were delayed or cancelled solely because of air traffic congestion. Total of 3827 flights representing 86,365 passengers had to be cancelled or were unable to land at LaGuardia because of traffic congestion. During the same period a year later not a single flight was cancelled due to traffic congestion and only 21 percent were delayed from that cause, he claimed.

During the 1946-47 period 4582 flights were delayed for an average of 33 minutes per plane. A year later only 555 flights were delayed for an average of only 11 minutes per plane.

Arnold credited the increased traffic handling efficiency at LaGuardia to these steps taken by the Civil Aeronautics Administration and the airlines:

• **Installation of ILS**—This substituted a straight-in approach for the circling of a radio range let down procedure. Effectiveness of the ILS when wind shifts necessitated landings in the opposite direction from that in which the system was installed was obtained by using the back course of the localizer plus a portable glide path installation beamed in the opposite direction from the permanent glide path. This technique is also used at Chicago Municipal Airport.

• **Installation of GCA**—This gave the control tower operators a positive picture of air traffic in the approach zone for the first time and enabled them to control traffic more effectively by feeding approaching planes into the instrument landing runway faster and clearing departing aircraft away from landing and holding traffic.

• **Relocation of Holding Stacks**—Stacks were relocated closer to the airport to reduce time required from leaving the stack to making a landing. Holding patterns were also made smaller and more precise to allow pilots to get into their final approach faster.

• **Use of an Automatic Approach Calculator**—This device is another aid in bringing aircraft into the final approach faster. CAA traffic controllers at Chicago stated that this device is not necessary where search radar can be used for traffic control.

• **Use of VHF Radio Communications**—Doubling of VHF radio frequencies available for traffic control plus development of a system of feeding planes through approach control assisted in speeding up the flow of air traffic. The U. S. Air Force has been using a system of this type but based on a more elaborate radar equipment (CPN-18) control tower personnel was also increased at LaGuardia.

• **Establishment of Definite Traffic Lanes**—A system of approach and departure was established for all airports in the New York metropolitan area that separated traffic destined for various airports and also separated arriving and departing traffic for the entire area.

All of these measures increased the capacity of the air traffic control system under instrument flying conditions by 300 percent in the New York area, Arnold said. A more conservative estimate of improvements possible with the equipment cited by Arnold was made recently by the Radio Technical Commission for Aeronautics which reported an increased efficiency of about 25 percent would be possible under these conditions.

Damon Heads ANDB

Ralph Damon, president of American Airlines, was named last week to head the Air Navigation Development Board that will guide a billion dollar, joint military-civil electronic airways and traffic control system. Damon previously was chairman of an *ad hoc* committee on navigation of the Research and Development Board that drew up the original plans for administrating the program (AVIATION WEEK, Aug. 16. Douglas H. Ewing of the Radio Corp. of America was appointed director of development for the ANDB. A staff of five electronic engineers will be selected by the Board about Dec. 1 to work under Ewing.

YEAGER GETS MACKAY CITATION

Capt. Charles Yeager, first pilot to fly a plane faster than the speed of sound (Aviation Week, Dec. 22, 1947), receives a framed citation for the Mackay trophy award at Air Materiel Command headquarters, Wright Field, from Lt. Gen. B. W. Chidlaw, deputy AMC commanding general. Citation proclaims Yeager's first supersonic flight in the Bell X-1 research plane as the most meritorious flight of the year.

More About the X-1 . . .

The X-1, three years after its' construction and nearly two years after its first flight, continues to be a mine of new information for the engineer. Despite release of many facts by the Air Force and the National Advisory Committee for Aeronautics, and a detailed report on the plane in AVIATION WEEK *July 26 and other issues, new data on the X-1 still turn up.*

Stanley W. Smith, Bell Aircraft Corp.'s project engineer on the airplane, and Capt. Charles E. Yeager, the USAF pilot who first flew it faster than sound, recently discussed the craft at a meeting in New York of the Institute of the Aeronautical Sciences. At this meeting and a news conference preceding it, AVIATION WEEK*'s technical editor Irving Stone gleaned these little-known facts about the X-1:*

- In trials of the X-1, sonic speed has been exceeded on 10 to 15 occasions.
- The craft has been taken to well above 60,000 ft. This is a record, though not official, for piloted airplanes.
- The X-1 has been flown vertically both up and down.
- With gear and flaps up, the craft stalls out at 240 mph. indicated.
- Three most important instruments in this plane are the Machmeter, airspeed indicator, and altimeter.
- The X-1 has more thrust per pound of airplane weight than any other craft. This is considered the deciding factor in being able to attain and exceed sonic speed.
- Asked if he'd rather fly an F-51 or the X-1 in combat, Capt. Yaeger (a former Mustang pilot) unhesitatingly chose the conventional fighter but humorously added, "Maybe it would be a good idea to sign up for X-1 service—then you'd be sure to stay in the States."
- In effect, therein lies the key as to why the X-1 design is far from that of a practical machine (as distinguished from its value to research)—not enough fuel can be carried to provide reasonable range.
- To increase the research potential of this type of craft, more fuel capacity will be required. But this gives rise to a perplexing cycle—more fuel carried means more thrust needed, more thrust means burning fuel faster. And you're faced with the fuel problem again.
- Capt. Yaeger has been piloting the X-1 for about 16 months, has flown the craft about 30 times, but this has meant comparatively little flight time—only 4 to 5 hours.
- With all motors operating, the X-1's fuel consumption is 588 gal. in 2½ min.
- Specific fuel consumption is .0058 lb. fuel/lb. thrust/sec.
- Pressurizing gas for the fuel system is forced directly into the fuel tanks.
- Thrust output may be varied, somewhat, by changing the pressure on the fuel.
- Alcohol carried by the X-1 is mixed with water (for cooling) prior to flight.
- Before rocket planes are considered "practical," some means will have to be devised to land them under their own power.
- Landing speed of the X-1 is between 148-150 mph.
- In the weight configuration now operating, the craft requires a 15,000-ft. landing run.
- Landing skids are not likely to be incorporated in future X-1 type aircraft.
- The needle-nose pointer extending from front of the fuselage houses pitot tube for pilot's instruments. Tube extending from left wing is used for recording pressures. Tube on right wing is for telemetering antenna.
- In flights to date, it has been found unnecessary to use the hydraulic dampener to prevent aileron buzz or flutter.
- No ignition trouble has been experienced—booster box is pressurized.
- No refrigeration system is required. Altitude affords sufficient coolness, and time of flight is very short.
- Deceleration effects in X-1 are not as serious as some engineers might believe. At any speed, value of deceleration has always been less than 1.
- No sheet magnesium is used in X-1's structure, but some castings of this material are employed.
- Contrary to some published reports, the X-1 was not developed from German design data.

Record Flights

Radar suggested as new timing device to eliminate low level flying.

International custodian of aviation records, Federation Aeronautique Internationale, has been asked to change procedure of speed record flights to permit use of radar markers and tracking devices, so record-seeking planes may end the dangerous low level flying required for visual recording methods now used. National Aeronautic Association representatives returning from the recent Paris FAI meeting report that their recommendation for the new radar system was referred to a FAI committee for further study.

The radar recording system developed by Air Materiel Command engineers has already been tested on a practice course near the AMC Wright Field headquarters at Dayton.

▶ **Engineers on Project**—Corps of Engineers has been assigned project to construct such a speed course, suitable for record flights up to 50,000 ft. altitude, at Muroc Air Force Base, Calif. (Project is part of a $2,878,000 new construction program at Muroc, which also includes rocket test facilities and a control tower.)

With the new system, record-seeking planes may fly at any selected optimum altitude up to 50,000 ft. so long as virtually constant altitude is maintained in the flight.

Tests made with the radar equipment on the practice course have shown that the equipment will time with an error of less than 1 percent. NAA has specified that any new record established under this new system will be at least 2 percent beyond the old record.

At each end of the new course a vertical radar beam is projected. When the plane on a record run penetrates the beam, at whatever altitude, this activates an electric stop on a clock at the base of the beam. Meanwhile radar tracking devices will be used to insure that the record plane maintains its designated altitude throughout the run.

▶ **Other Projects**—Other Air Force research and test facility projects assigned to the Corps of Engineers simultaneously with the Muroc projects call for expenditures of $1,886,000 at Wright-Patterson Air Force Base, Dayton, including $1,051,000 for armament laboratory and firing test facilities, $506,000 for rotary wing test facilities and $330,000 for auxiliary building for wind tunnel; expenditure of $410,700 at California Institute of Technology for a supersonic wind tunnel, and $606,000 for rocket test facilities at Holloman Air Force Base, Almogordo, N. M.

One fact which may work against FAI approval of the new proposed record course is that many other countries in the Federation do not have the equipment necessary for such a course and may not wish to spend the funds for it. Americans are pressing for its use as an accepted alternative method, although its advantages are such that eventually it may well become the only official method.

Hazards involved in the low-level record attempts were clearly demonstrated to a large crowd of American observers at the National Air Races this year, when Maj. Richard L. Johnson flew a North American swept-wing F-86 across Cleveland Airport for an unofficial new speed record. Although he made six passes across the field, timing cameras failed to catch two of them, and Johnson varied slightly from the course on another one. Later at Muroc, under more favorable conditions the same pilot and the same plane set a new record of 670.981 mph. On one of his passes at Cleveland Johnson narrowly missed collision with an Aeronca plane which was illegally flying in the vicinity of the course.

Stratocruiser Gross Up

The Boeing Stratocruiser has been certificated by the Civil Aeronautics Administration for a gross weight of 142,500 lb., Wellwood Beall, Boeing's vice president in charge of engineering and sales, announced last week. CAA has also approved the operating manual for the 340 mph. double-deck transport.

In announcing approval of the operating manual, Beall declared that during the 18 month testing program which culminated in CAA's award of a type certificate for the Stratocruiser on Sept. 3, not one basic change was made in the plane. Boeing, CAA and airline crews flew more than 700 hr. during company and CAA certification tests.

Besides the new gross weight—7500 lb. more than originally guaranteed—the Stratocruiser has been approved for a design useful load of more than 30 tons. This is higher than any commercial airplane ever licensed in this country, Beall said.

Wright Plane Expected

Packing cases containing the world's first powerplane, the Wright Brothers 1903 Kitty Hawk biplane, were to arrive in Washington Nov. 14 by truck from New York for delivery to the National Museum. Following a brief reception ceremony, officials of the Smithsonian Institution which operates the National Museum, were to take custody of the dis-assembled plane preparatory to re-assembling it for unveiling on Dec. 17, the 45th anniversary of its first flight.

LETTERS

Another 99'er Writes

Paul Andrews' "Coast-to-Coast by Sky-Coach" Oct. 18 moves me to write another —my own. I nonskeded from San Francisco to Washington, partly out of curiosity and mostly to save about 50 bucks. Now I'm convinced the "Ninety-niner" or equivalent service ought to get a fair trial before the public.

It sounded like easy sailing, to hear the ticket agencies in San Francisco and Oakland tell it. I soon learned they didn't know anything, and didn't care, except for the commission.

Five o'clock departure time had long passed before any responsible representative showed at the nonsked office in the International Building at Oakland Airport. I couldn't tell whether the counter men who finally appeared were with ticket agency or airline. Four or five of them joined in wild confusion to bollix all baggage, tickets, and whatever they touched. True, they spent half their time taking abuse on account of extravagant ads and agency promises. Between 5 and 11 o'clock I heard five or six furious rows.

A DC-3 finally rolled out of the dark and somebody said that was it. It had been modified, with shortcuts: no reading lights, no air vents. But so far as I could tell it was in good shape, and fairly clean. If soundproofing had been intended it wasn't very effective. There was no water for the wash-bowl, ever. The toilet was chemical, clean, and the door was held shut by your foot. Food was coffee and sinker buns.

The stewardess was untrained but efficient and pleasant. I had four different pilots, every one cautious, skilled, and courteous. They bypassed thunder heads, stacked very carefully, and were attentive to their instruments, maps, radios. (I was peering into their pit.)

Seemed to me they were throttled back most of the time, probably to save gasoline. I couldn't be sure. They took four or five hours longer than the scheduled lines do, with equivalent planes. Apparently they had no ramp privileges at all. Each landing they would stop out on the taxiways, and the fuel truck would come out. At Washington a jeep came out to get passengers and baggage. With rain, it would have been a mess. Instead of handing us our baggage, they ran it through National's wonderful luggage delaying system, same as the regular airlines do. They lost mine, because one of the comic opera cast at Oakland had tagged it for New York. I saved it by defying a guard and dashing out on the field.

I didn't see this myself but was told that the pilots had a wad of folding money with which they paid for gasoline on the barrel head. As best I could make out, the boys had no route and no timetable: they could go where, as, and if they could find good weather. And that's a safety point on their side. On this trip they went through Albuquerque, and said they usually did, to avoid northern altitudes that discomfort the passengers. They had a fold-in ladder, and were charmingly independent of airport routine.

As I said, everybody started out mad at them. But as they loafed along, the ship's crew and company began to have a good time. It was something like a sailing cruise, or a Chaucer pilgrimage. They stopped for lunch at one of the incredible greasy spoons that characterize U. S. airports. The pilot announced on public address that it was time to go. The stewardess seized the microphone to say there was really no hurry. When they heard that Washington was getting soupy, they skipped dinner at Pittsburgh, whereupon your correspondent produced thermos bottles and sandwiches, in long supply by fond relatives, and dulled the edge of general starvation.

The airplane was 100% loaded, and I heard that most other nonskeds were. Some by-standing experts told me that the agencies charter the planes in such a way as to produce, in effect, scheduled departures, or that the operators alternated to the same end. If so, it ought to be obvious to a quick checkup. If the operation is illegal, it seems to me that's where the fault lies. Evidently a lot of people want "Ninety-nine" service regardless of words in a book at Washington. And they don't care who gives it. The ride is not plush, but it's not pioneer stuff either. It costs less than Pullman, and it's twice as fast.

BLAINE STUBBLEFIELD
Washington, D. C.

(Blaine Stubblefield is a pioneer pilot, and was for years a writer for McGraw-Hill publications, including AVIATION, AIR TRANSPORT, AVIATION NEWS. *His letter was unsolicited by the editors.).*

Praise from ATA

Because I have had occasion to be critical of some of your editorials in the past, I am particularly pleased to express my appreciation and approval of the one you published in the Nov. 1 issue of AVIATION WEEK, entitled "Persuading Millions to Fly."

Actually, you have put your finger on two of the most serious problems facing air transportation—fear and indifference. Many people simply do not think of traveling by air. Others are afraid to fly because they have read the headlines of dramatic accidents and do not realize that in reality traveling by air is safer than many other things they do each day without any thought of danger.

ROBERT RAMSPECK, Executive Vice President
Air Transport Association of America
Washington 6, D. C.

PRODUCTION

Airline 'Wing?'

Signs indicate Northrop giving serious thought to all-wing jet transport.

Proposals for a Flying Wing jet transport, perhaps adapted from the eight-jet B-49, apparently are ripening at Northrop Aircraft, Inc.

While the Hawthorne, Calif., manufacturer generally has been conservative in its publicity on developments yet to come, it recently has sponsored several significant reports on the future of all-wing aircraft for transport purposes. More than a year ago, John K. Northrop, in his Wilbur Wright Memorial Lecture in London, discussed a B-35-B-49 sized all-wing transport to carry 50 passengers and 40,000-50,000 lb. of cargo. Except for that (and an artist's conception for Fortune magazine), the company has dealt with the wing transport idea somewhat abstractedly.

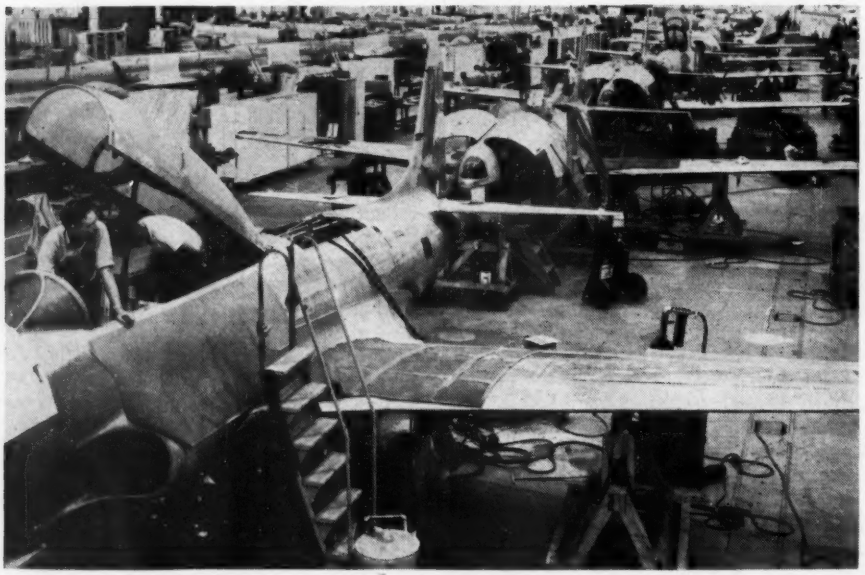
▶ **Build-Up**—Now, however, it looks like the build-up has started for some tangible plans for a jet wing transport. The company's plant magazine not so long ago published a special insert in color showing sketches for passenger cabin arrangements of such a plane. In addition, Northrop vice president-sales, John W. Myers, has described a Flying Wing transport in detail to the Southern California chapter of the National Aeronautic Association.

Myers said that passenger versions of the Flying Wing could easily be adapted from the B-49. He added: "Farsighted Air Force sponsorship has enabled our president, Jack Northrop and our staff of engineers to pioneer and test the Flying Wing design. Although no commercial versions are now planned we know that the spectacular performance which this airplane has demonstrated as a bomber can be had in other type airplanes as well."

▶ **Performance**—USAF release recently of the endurance performance of the YB-49 underscores the specifications Myers detailed for a Flying Wing transport "similar" to the jet bomber. Such a plane would carry 40 passengers and ten tons of freight from New York to Los Angeles in 5 hr., 50 min.

Myers said the direct operating cost of the trip would be about $16 per passenger and baggage. Further, he anticipated Flying Wings grossing 500,000 lb. and capable of crossing the continent at costs as low as 3¾ cents per ton mile.

To obtain those detailed estimates, Northrop obviously has taken a careful look-see at the transport possibilities of a jet Flying Wing. With engineering and tooling costs of the B-49 written off in large measure by the 30-plane Air Force order, Northrop seems to be in a good position to turn a military design into a commercial plane at relatively low cost. Probably no other manufacturer today has a jet bomber which could lend itself as readily to commercial modification.



TF-80Cs ROLLING

On this "temporary" production line, Lockheed Aircraft now is in full production of its two-seat dual-control TF-80C. Company plans for a new production line outfitted with permanent jigs indicate anticipation of extended Air Force orders.

Boeing Calls for Help

With employment at its Seattle, Wash., plant already in excess of 20,220, the Boeing Airplane Co. issued a call for 2000 additional men to fill immediate needs and acknowledged that additional requirements beyond this figure may develop before the first of the year.

The company's expanded experimental and production programs were cited as reasons for the increased requirements. The Stratocruiser, B-50 and C-97 are in production while the XB-52 and various jet projects are included in the experimental program.

Boeing's Seattle payroll now exceeds $6,400,000 a month. Present employment is the highest since wartime and compares with total employment of 18,933 as of April 21, before the strike which ended last month.

PRODUCTION BRIEFING

Consolidated Vultee Aircraft Corp., San Diego, has completed delivery of the last of five Convair-Liners ordered by Continental Airlines. Convair now has delivered 78 of the transports, including two executive types.

Kaman Aircraft Corp., Windsor Locks, Conn., expects CAA certification of its K-190 industrial helicopter within 60 days and has already begun building structures and letting subcontracts for components of its first production craft. Company expects to have six copters in service by spring.

Jack & Heintz Precision Industries, Inc., Cleveland, has purchased from War Assets Administration machinery and equipment originally valued at more than $5,000,000. The equipment has been leased. J&H also is negotiating with WAA for purchase of additional factory space.

Kaman Aircraft Corp., Windsor Locks, Conn., has received a new Navy contract for furnishing information on helicopter flight characteristics of stability, control and handling.

McDonnell Aircraft Corp., St. Louis, promoted Kendall Perkins from assistant chief engineer to assistant to the vice president-engineering; E. J. Englebert from production manager to executive engineer.

Edo Corp., College Point, N. Y., appointed Kenneth D. Vosler director of sales research. He has been with Edo since the company's founding in 1925.

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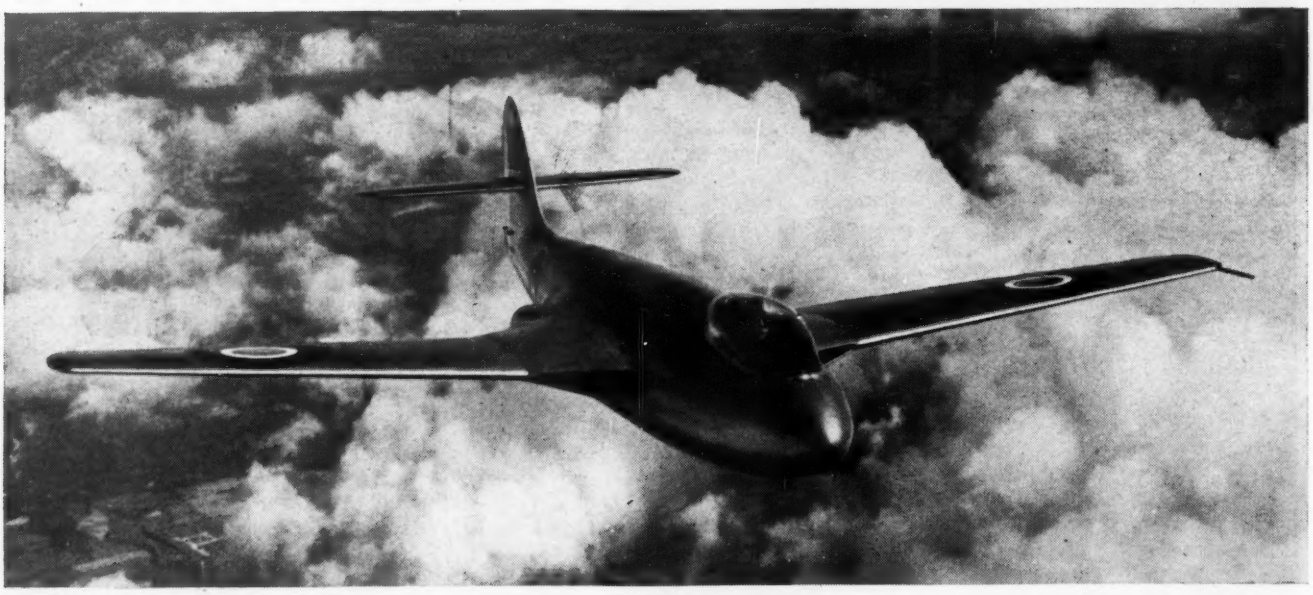

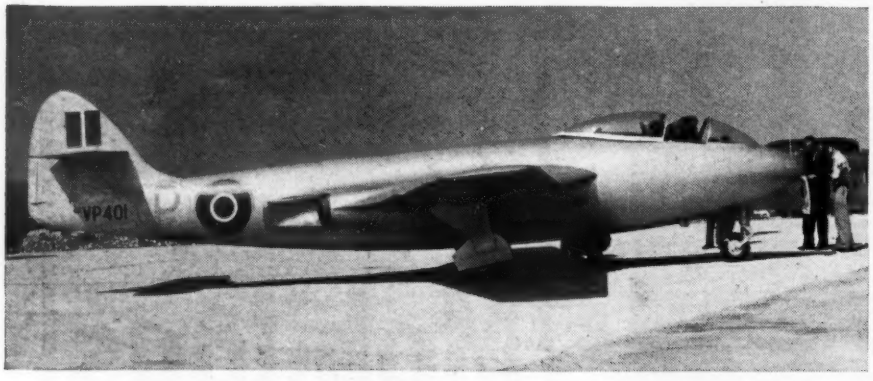

Hawker: Britain's Fastest Plane

High speed is complemented by long range attained with split ducting permitting increased fuel storage.

(*McGraw-Hill World News*)

LONDON—Probably Britain's fastest fighter is the new Hawker jet, designed to a specification laid down in 1946.

Built as a carrier-based plane, this folding-wing craft, the N.7/46, is extremely sturdy in construction—heavier than a comparable land-based fighter aircraft.

▶ **Navy, RAF Interest**—The Navy is reported much impressed with the plane, but it has not yet been ordered, although it made its first flight in September, 1947.

The RAF may also buy it, in a slightly lighter construction without folding wings and arrester hook. Appearance of this version, the P.1040, is the same as the N.7/46 shown in the accompanying photos on this page.

Proof that the services are still considering the plane is evident from the fact that specific details of performance or construction have not as yet been disclosed.

▶ **Speed Potential**—The Hawker N.7/46 has now flown well over 50 hr., many of them at close to its maximum speed. This is officially stated as "over 600 mph.," but it is believed that it will exceed 650 mph.

Power plant is a Rolls-Royce Nene developing 5000 lb. thrust.

▶ **Split Ducting**—Air inlets have been split and moved back to the wing roots, and jet outlets have also been split and moved forward to wing root trailing edge. The wing root section has been broadened to accommodate the arrangement. This form of installation would be possible only with a centrifugal-type jet with reverse flow; no axial-flow jet powerplant could be fitted in so short a space.

▶ **Range Boosted** — Main advantage gained with use of the split air-inlets and exhausts is stated by Hawker personnel to allow more room in the fuselage, both forward and aft of the engine, for fuel.

As a result, range of the N.7/46 is, officially, "well beyond that of any other Naval fighter" and, unofficially, between three and four hours, or nearly double that of present British jet fighters. Estimate is 1750 mi.

▶ **Performance Witnessed**—An AVIATION WEEK observer at a demonstration flight at the Langley Aerodrome reports a very favorable handling performance—a series of slow 360-deg. rolls at well below 500 ft.; very steady inverted flight at about 300 ft.; well-executed Immelmans; and a fast zoom climb after coming in level.

Span of the craft is 36½ ft., length 38 ft. 4 in. The Hawker has extremely narrow undercarriage-track — less than the 5-ft.-wide road-haulage trailers used by the Navy.

Canopy is jettisonable, and cockpit is fitted with an ejector seat.

First public appearance of the plane was at the Society of British Aircraft Constructors' show at Farnborough last September.

The craft was designed by Sidney Camm, creator of the Hurricane, Typhoon, Tempest and Fury, who says that he has gone well beyond the Hawker N.7/46 in his present design.

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Industry Seeks Ideal No-Fire Hydraulics

High performance seen as other prime factor for new medium.

By Robert McLarren

Although hydraulic fluid of the type currently in use constitutes a far less serious fire hazard than the fuels and lubricants carried aboard aircraft, its flammability has been blamed directly for a considerable number of aircraft fires in recent years.

A Royal Air Force survey, taken in 1943, of combat losses resulting from fire disclosed that between 2 and 3 percent of such instances were traceable to hydraulic fluid.

This revelation created an interest by the (then) Army Air Forces and Naval Aviation that has given impetus to the present broad research program in nonflammable hydraulic fluid.

▶ **Broad Interest**—On the civil side, the flammability of hydraulic fluids contributed to the seriousness of a series of fires in the early model Lockheed Constellation, particularly the forced landing of a Constellation at Willimantic, Conn., in the summer of 1946, after a broken drive shaft to the compressor severed a hydraulic line. In the grounding of the planes that followed this and other fires, one of the modifications was to prevent hydraulic fluid leakage.

Following this, both the Air Transport Association and the Aircraft Industries Association formed subcommittees to investigate the requirements for a nonflammable fluid.

The program has been continually expanded until all of the various segments of the U. S. aviation activity are now working participants. These include USAF, Naval Aviation, Civil Aeronautics Administration, ATA, AIA, and the National Advisory Committee for Aeronautics.

But to date there is no nonflammable hydraulic fluid fully approved for use by all or even a majority of these groups, although several formulations have met with individual approval.

▶ **Viewpoints Differ**—Basic problem is to create a fluid which is both nonflammable and possesses satisfactory operating characteristics for aircraft systems.

Each of the groups mentioned have placed varying emphasis on these two basic requirements, and it is this difference in objective that constitutes the existing lack of unanimity among them.

The Air Force is adamant that there be no compromise with the existing performance requirements (Specification AN-VV-O-366), since fluid prepared to this specification, and currently in use throughout the services and the airlines, has proved satisfactory over the widest range of conditions, both of temperature and geography, yet encountered.

It is, therefore, gravely concerned over the trend in all nonflammable fluids developed to date towards impairment in performance as a permissible price to pay for no-fire characteristics.

The Navy has accepted this perform-

Nonflammable Hydraulic Fluid

(General Requirements)

VISCOSITY

Air Force: Satisfactory operation over a range of −65 to 160 F.

Industry: No upper limit requirements, but satisfactory operation to −40 F.

Air Force: Minimum viscosity at 130 F. of 9 centipoises and maximum viscosity at −40 F. of 500 centipoises.

Industry: Viscosity at −40 F. of 2000 centistokes for all commercial aircraft and 2000 to 7000 centistokes for certain other types.

Note: Centipoise is a measure of the viscosity of a fluid flowing slowly through a long tube. Centistoke is viscosity measure with a small sphere falling through the fluid under action of gravity. There is no convenient conversion factor between the two.

PUMP WEAR

Air Force: This characteristic will be determined by wear measurements on pump through which fluid has been run at 3000 psi. at 200 F. for 100 hr.

Industry: Determined by wear measurements on a pump through which the fluid has been run at 3000 psi. at 160 F. for 30,000 cycles.

Note: Wear includes weight loss in pilot bearing, cylinder block and bronze thrust knuckles, evidence of corrosion in pump bearings, excessive looseness of piston knuckle joints and scoring on thrust plate.

COMPATIBILITY

Air Force and Industry: Both groups require that the new fluid be compatible with existing fluids (Industry requires that new fluid be compatible with at least five percent of old fluid) to permit system changeover with a minimum of difficulty. New fluid must be soluble in all proportions with old fluid from −65 to 160 F.

FLAMMABILITY

Air Force and Industry: Both groups in agreement on test method proposed by AIA including ignition of fluid-soaked office file card, spraying of fluid on burning oil-soaked rag and ignition of high-pressure fluid spray. These tests are qualitative only with results such as "will not ignite," "flashes with difficulty," "flashes readily," etc.

In addition, the Air Force requires (1) that the fluid not ignite spontaneously at any temperature below 1000 F., and (2) a .50 cal. gunfire test, which it will conduct upon request.

OXYGEN DEMAND

Air Force: Percentage oxygen required for flame propagation will be limited to a minimum of 50 percent for any proposed fluid.

Industry: Percentage required for propagation shall be 30 percent minimum.

TOXICITY

Air Force and Industry: Both groups require non-toxicity properties of the new fluid, although specific requirements for this consideration are difficult to formulate.

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ance impairment in return for nonflammability, and both the airframe and airline industries are willing to accept these fluids having a performance considerably less rigorous than those required by the services. The three general avenues of approach by the Air Force, Navy and the civil groups is outlined below:

▶ **Air Force Slant**—The Air Force, following examination of the British report as well as statistics of its own Office of Flying Safety, initiated a nonflammable fluid program in the National Defense Research Council, and a panel was formed under the direction of Dr. M. R. Fenske.

When the NDRC was dissolved in 1945, the Air Force, in conjunction with the Navy Bureau of Ordnance, formalized the program into a research contract with the Petroleum Refining Laboratory, Pennsylvania State College. In addition, work was undertaken at the Materials Laboratory, Air Materiel Command, Wright Field.

This program had for its objective the evaluation of an entirely new base stock for hydraulic fluid to replace the petroleum base previously used.

During the course of the program, such materials as water-glycol mixtures, tri-alkyl phosphate esters, boric acid esters, organic alkyl carbonates, dibasic acid esters and various halogenated materials were investigated.

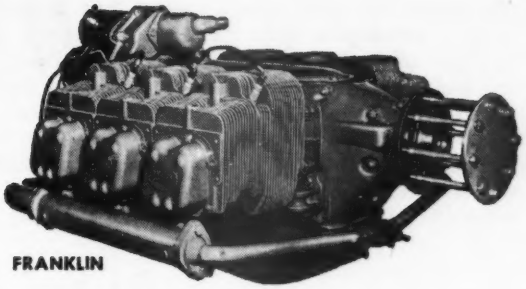
Although each displayed promising characteristics, none proved of sufficient merit to warrant further consideration and the Air Force has largely abandoned this approach in favor of the development of "snuffer" materials which can be used with the existing hydraulic fluid.

If such materials can be developed, it feels that the problem of hydraulic fluid supply can be simplified greatly since it will require only the addition of the new material to the current production-storage-handling-use sequence of a tried-and-proven fluid.

Although a number of promising snuffer materials have been developed, they have proved costly and are not readily available either in nature or in production. However, work along this line to date has convinced the Air Force that such materials can be developed and that their use will provide the required nonflammability characteristics with no impairment in the performance of AN-VV-O-366 fluid.

▶ **Navy Fluid**—Naval Aviation has continued the original substitute base stock approach and has developed a nonflammable hydraulic fluid which has their complete approval.

Known as "Hydrolube U-4," the new fluid has passed a wide variety of laboratory tests and received a thorough service test in use aboard a squadron of Vought F4U Corsair fighters. It is now



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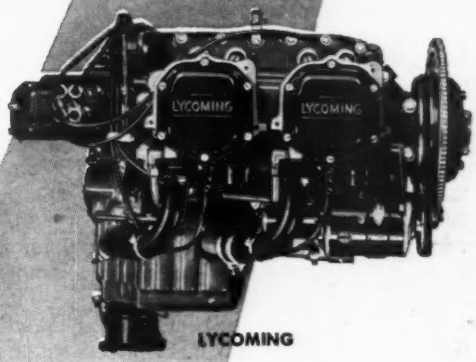

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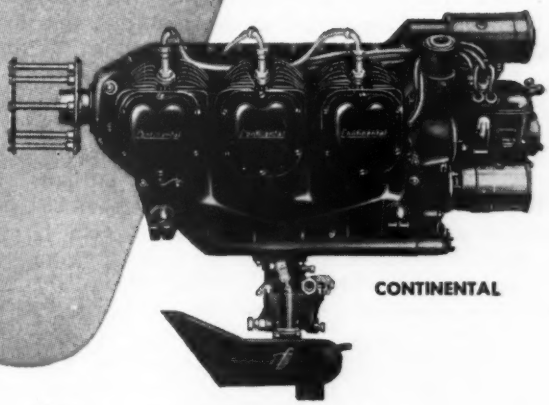

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Bendix AVIATION CORPORATION

being service tested in other types of aircraft and every indication points to its use throughout Naval Aviation in the future.

Hydrolube is made up of a base fluid composed of 55 percent (by volume) ethylene glycol and 45 percent water to which a special polyalkylene glycol copolymer is added. The polymer thickens the fluid to the proper viscosity. The corrosion inhibitor is diethylethanolammonium phosphate diisopropylammonium nitrate for vapor phase inhibition and sodium mercaptobenzothiazole for copper protection.

To eliminate the difficulties inherent in the new fluid's water base, an antifreeze, a thickener, corrosion inhibitor, wear preventative and an organic chemical to make soluble all these ingredients, are used. Despite this chain of cause-and-cure ingredients, the fluid has proved imminently satisfactory.

At present, Hydrolube U-4 sells for $2.50 to $3.50 per gal.—two to three times the cost of mineral oil fluid—but the Navy feels that this is a small price to pay for the safety feature.

The fluid was developed by the Bureau of Aeronautics in cooperation with the Office of Naval Research. The Ammonia Dept. of the E. I. du Pont de Nemours & Co. made the formulations of the water base fluid, and the Union Carbide and Carbon Corp. provided the polymers. The latter company is currently producing the fluid in commercial quantities. The material is prepared to Navy Spec. 51-F-22 (Aer).

▶**AIA Program**—The Aircraft Industry Association approach to the problem has followed yet another path.

In coordination with the Air Transport Association, AIA early recognized the need for a nonflammable hydraulic fluid and proposed a study program within its Research and Testing Subcommittee of the Aircraft Technical Committee, more than two years ago.

During this period, the subcommittee coordinated member recommendations into a specification for a new fluid meeting the requirements suggested by committee members.

These recommendations were further coordinated with a special committee study of the Society of Automotive Engineers, and the resulting recommendations were published May 1, 1948 as SAE Aeronautical Material Specification No. AMS 3150. It covers the technical requirements for an "interim" nonflammable hydraulic fluid.

Following formulation of this specification, the AIA has designated the Cornell Aeronautical Laboratory to conduct evaluation tests on fluids prepared to meet the new requirements. ATA has also endorsed the new program at Cornell, which is under the direction of E. R. Dye, head of the Development Division of the laboratory.

A manufacturer of fluid submits a sample to the laboratory where it is evaluated at his expense, and a report is prepared and furnished to him only. In the event the material meets the tests, it then receives aircraft and airline industry approval for use.

Manufacturers engaged in nonflammable hydraulic fluid research include Standard Oil Co. of Calif., the Norton Co., du Pont, Hollingshead, Union Carbide and many others—indicative of the wide-spread interest in the problem.

One of the first fluids expected to undergo Cornell tests for compliance with the new specification is Skydrol, a new liquid developed jointly by Monsanto Chemical Co. and Douglas Aircraft Co., Inc.

Skydrol is an ester base compound and does not contain water, halogenated hydrocarbons or salts, although its chemical composition has not yet been announced.

The new material has passed the required flammability tests, according to reports from both companies, and has undergone extensive tests in a laboratory hydraulic system.

Both companies admit that the new compound attacks natural and synthetic rubber used in hydraulic packing and gaskets, and its use would require removal of these materials.

It also softens insulation on electrical wiring, and adjacent lines would have to use Nylon-type insulation if safety is to be assured.

Other properties of the new fluid await confirmation by either Cornell or similar impartial testing laboratory.

▶**CAA's Participation**—Meanwhile, the Civil Aeronautics Board has withheld several proposed regulations requiring the use of approved nonflammable hydraulic fluids in scheduled airlines.

However, the Civil Aeronautics Administration is testing several fluids at its Aeronautical Center, Oklahoma City. Tests on Hydrolube U-4 have been carried out in a Douglas DC-4 and preliminary results indicate that it is basically satisfactory although evidence of magnesium corrosion has been found.

These early results are not conclusive, however, and CAA has expressed doubt that slight corrosiveness to magnesium is a serious drawback.

There is, of course, little doubt of the safety advantages to be gained from the development and wide-spread use of a nonflammable aircraft hydraulic fluid, but it is also mandatory that such a medium possess the dependable performance characteristics of those used over the past decade.

The new regimes of flight (supersonic speed, altitudes well into the stratosphere) are even placing greater demands on these characteristics so that even present fluids may not prove adequate in the very near future.

It is obvious that the dual attack on the problem is essential and it should prove equally obvious that many manhours and dollars must be spent on research, development and extensive service tests before a thoroughly satisfactory nonflammable high-performance hydraulic fluid is available to U. S. aviation.

Jet Fuel Problem

Pressure for more efficient jet airplane fuel is up against a road-block in the form of an increasingly short supply of aviation kerosene. Optimists who blithely said that jet engines can run on anything, were partly right, but jet engines can run better on fuels with higher BTU.

New Army-Navy jet fuel specifications call for up to 30 percent aromatics in a compromise effort to cut the kerosene in a gallon of jet fuel to only 70 percent. Only about 5 or 6 percent of the petroleum output is currently allocated to AF-Navy jet planes, and pressure is on for further cut in this proportion. Meanwhile there is an ever-increasing armada of jet aircraft entering U .S. military service. But the technical pressure is still on for specialized jet fuel which will meet the exacting efficiency requirements of jet engine performance.

Combination of circumstances means that fuel requirements of another war would eat drastically into civilian motor fuel and heating fuel requirements, causing a fuel rationing which would make World War II rationing seem very tame.

No Superchargers

Scattered industry rumors that superchargers were used on the Continental engines of the first and second-place winners in last fall's Goodyear Trophy Race finals at the Cleveland National Air Races, are without foundation and are discredited by investigation of the actual facts.

Inquiry discloses that the first three airplanes finishing in the race were impounded and checked immediately after the finish, under supervision of Ben O. Howard, veteran racing and test pilot, and official National Air Races referee, and William Gough of NACA, head of the NAA technical committee.

James Kinnucan, Continental Motors vice president and chief engineer of aircraft division, and Locke York, also of Continental, cooperated in the checking of the engines, and provided instrumentation for measurements. Results of the tests showed that all three of the first finishers had complied with powerplant specifications of the Goodyear Trophy Race committee.

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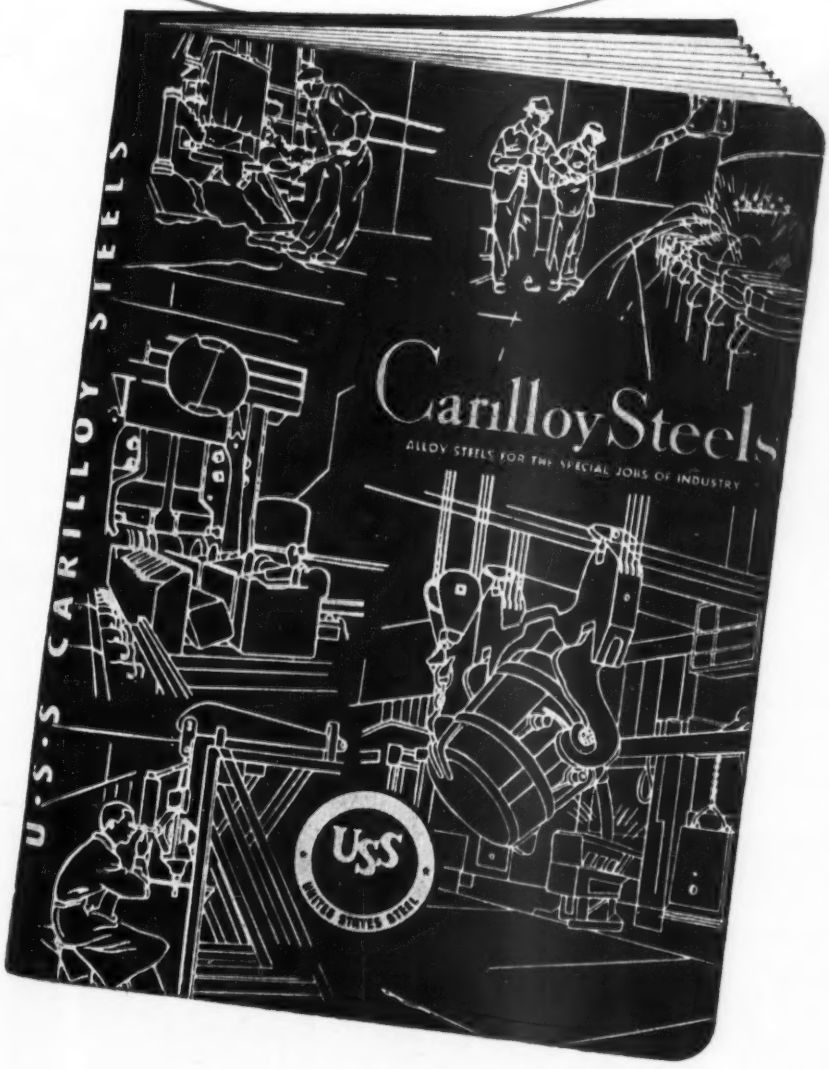

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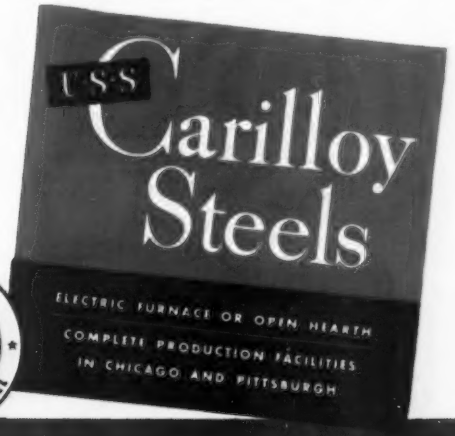

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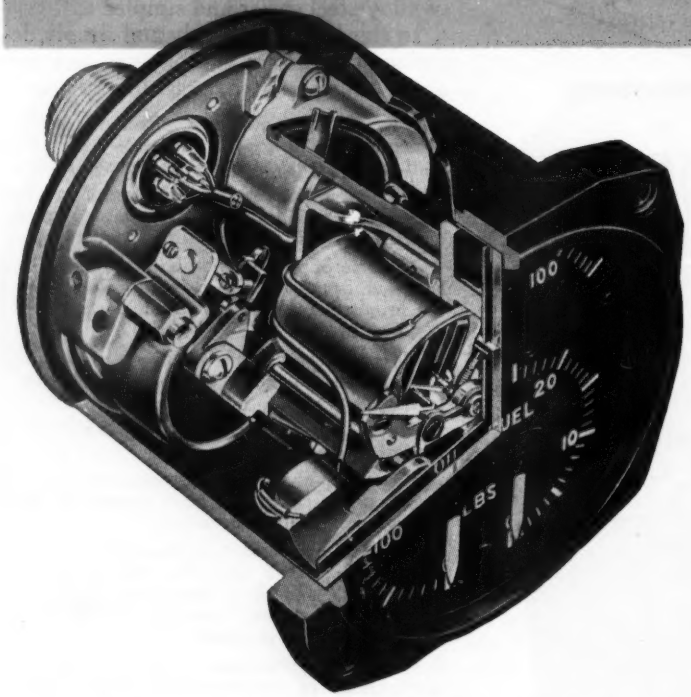

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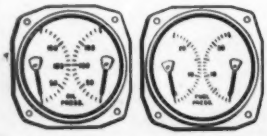

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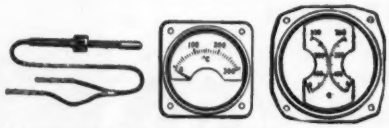

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Reveal Increased Turboprop Efficiencies

Errors seen in present calculations for turboprop versus turbojet.

By Ivan H. Driggs*

Engineering studies to date have usually shown that the turboprop engine reaches its maximum efficiency at about 500 mph.

For higher speeds, engineers have indicated that the turbojet is a more efficient propulsion unit.

For this reason, research and development programs have been confined to these prospective areas, and design planning engineers on new aircraft usually select one or the other of these power plants on the basis of the design speed falling either below or above this 500-mph. value.

In the author's opinion, this arbitrary dividing line is much too low and the turboprop engine is being penalized because of inaccurate efficiency calculations.

Actually, the speed at which turboprop efficiency falls below that of the turbojet is much higher than has been supposed. This is because, in a large measure, conclusions have not been drawn from analyses made on a comparable basis.

▶ Efficiencies Defined – Jet propulsion efficiency is normally defined as the ratio between power available for propelling the airplane and power *added* in the system by the fuel.

Propeller efficiency is the ratio between the power available for propulsion and the *total* power in the system used in driving the shaft.

It is evident that these definitions are not consistent, since useful thrust power is divided by different quantities in each case.

▶ Equations Developed–In a turbojet engine,

$\eta_j P_T = \frac{W}{2g} u_j^2$, kinetic energy of moving jet/sec.

= Power in moving jet stream ft.-lb./sec.

Then

$$u_j = \sqrt{2g\,\eta_j \frac{P_T}{W}} \qquad (1)$$

$g = 32.2$ ft./sec.^{2}

Since

$$P_a = \frac{W}{g} u_o (u_j - u_o)$$

$$P_a = \frac{W}{g} u_o u_j - \frac{W}{g} u_o^2 \qquad (2)$$

Now

$$P_D = P_T - \frac{W}{2g} u_o^2 \qquad (3)$$

since $\frac{W}{2g} u_o^2$ = Power originally in the airstream entering engine, ft. lb./ sec.

Then

$\eta_{pj} = \frac{P_a}{P_D}$, from definition above

$$= \frac{\frac{W}{g} u_o u_j - \frac{W}{g} u_o^2}{\frac{W}{2g\eta_j u_j^2} - \frac{W}{2g} u_o^2}$$

$$\eta_{pj} = \frac{u_o u_j - u_o^2}{\frac{u_j^2}{2\eta_j} - \frac{u_o^2}{2}} \qquad (4)$$

If the jet efficiency, η_j, is assumed to be unity, then

$$\eta_{pj} = \frac{2}{1 + \frac{u_j}{u_o}} \qquad (5)$$

This is the equation for jet propulsive efficiency that is normally employed. But, as a definition of efficiency this expression leaves much to be desired.

For instance if u_j equals u_o, the efficiency is 100%, but from Eq. 2 the propulsive power is zero.

Also, if u_j is less than u_o, η_{pj} is greater than 100% and the value of P_a becomes negative.

A definition is needed that makes η_{pj} equal zero when P_a is zero, and negative when P_a is negative. This appears the only way to avoid confusion.

An equation for the propulsive efficiency of a turbo-propeller engine is derived in similar manner from the definition mentioned above.

$\eta_{pt} = \frac{P_a}{P_T}$, by definition.

$$= \frac{\alpha\eta_g\eta_p\eta_t P_T + \frac{W}{g} u_o \sqrt{2g\,(1-\alpha)\,\eta_j \frac{P_T}{W}} - \frac{W}{g} u_o^2}{P_T}$$

This equation reduces to

$$\eta_{pt} = \alpha\,\eta_g\eta_p\eta_t + u_o \sqrt{2\eta_j\,(1-\alpha)\frac{W}{gP_T}} - \frac{W}{g}\frac{u_o^2}{P_T} \qquad (6)$$

▶ Comparisons Made – As previously stated, Eq. 4 and 6 are not comparable because the denominator used in the two cases is different; for the jet, the power added, $(P_T - (W/g)u_o^2)$, was employed as the denominator, while in the other equation only total power (P_T) was used.

This is manifestly an unfair comparison, since a smaller value of the power was used in the denominator of the jet equation than in the turboprop formula, (6).

To place these two definitions upon an equal basis, it appears more simple, and probably more desirable, to divide the power available for propulsion, P_a, by the total power, P_T, in both cases. This, then, makes

$$\eta_{pj} = \frac{P_a}{P_T} = \eta_{pt}$$

Equation for η_{pt}, (6), is already in this form, but Eq. 5 must be revised.

$$\therefore \eta_{pj} = \frac{\left(\frac{W}{g} u_o u_j - \frac{W}{g} u_o^2\right)}{P_T}$$

$$\eta_{pj} = \sqrt{2\eta_j \frac{W}{g}\frac{u_o^2}{P_T}} - \frac{W}{g}\frac{u_o^2}{P_T} \qquad (7)$$

Denominator in both equations might have been the added power (P_D), thereby reducing the turboprop efficiency definition to the same form as the turbojet, but this would only change numerical values and not affect the comparison.

It is possible, with differential calculus, to determine the maximum possible values for both Eqs. 6 and 7 so that a direct comparison can be made.

By inspection of Eq. 6, it is evident

Symbols For This Analysis

η_{pj} = Propulsive efficiency of jet.
η_{pt} = Propulsive efficiency of turboprop.
η_p = Propulsive efficiency of propeller alone.
η_t = Efficiency of turbine which drives the gears.
η_g = Mechanical efficiency of gearing.
η_j = Mechanical efficiency of jet nozzle.
u_j = Speed of jet out nozzle, ft./sec.
u_o = Speed of flight, ft./sec.
α = Ratio between total energy available and that used in driving the gears and propeller in a turboprop engine. (This latter term, α, is necessary since it is not practical, or desirable, to absorb all available power in the propeller-driving turbine.)
P_T = Total power available in the engine, ft.-lb./sec.
P_{Tst} = Total power under static condition, $u_o = 0$, and is constant for any engine.
P_a = Power used for propulsion, ft.-lb./sec.
P_V = Power in incoming ram air, ft.-lb./sec.
P_D = Power added by engine, ft.-lb./sec.
W = Weight of gas flowing through engine per sec., lb./sec.
W_a = Weight of air flowing, lb./sec.
W_F = Weight of fuel used, lb./sec.
F_n = Net thrust specified by manufacturer.

*Director, Research Division, Bureau of Aeronautics, Department of the Navy.

that the value of the propulsive efficiency will depend to a certain measure upon the power division between the propeller and jet. Therefore, it is desirable to determine the value of α which will make η_{pt} the greatest.

This value may be demonstrated to be

$$\alpha_{at\,\eta_{pt}\,max} = 1 - \frac{\eta_j}{(\eta_g\eta_p\eta_t)^2}\frac{W}{2g}\frac{u_o^2}{P_T} \qquad (8)$$

Substituting Eq. 8 back into Eq. 6, the value of η_{pt} max is found to be

$$\eta_{pt\,max} = \eta_g\eta_p\eta_t + \frac{W}{g}\frac{u_o^2}{P_T}\left[\frac{\eta_j}{2\eta_g\eta_p\eta_t} - 1\right] \qquad (9)$$

Now, similarly maximizing η_{pj} as a function of u_o in Eq. 7, value for maximum propulsive efficiency for a turbojet is determined to be

$$\eta_{pj\,max} = \eta_j/2 \qquad (10)$$

From Eq. 10, it is evident that η_{pj} can never exceed 50 percent if defined upon the same basis as that used for the turboprop engine. Since η_j will have a probable value of about 95 percent, the value of $\eta_{pj\,max}$ will be nearer to 47½ percent.

► **Efficiencies Plotted**—It is of considerable interest to plot Eqs. 9 and 7 together for comparison. Unfortunately, security regulations will not allow the results of current high speed propeller tests to be published, hence solution of equation 9 must be left in general form.

Eq. 7 is revised to read

$$\eta_{pj} = 2\sqrt{\eta_j\frac{P_V}{P_T}} - 2\frac{P_V}{P_T} \qquad (7a)$$

If η_j is assumed equal to 95 percent, η_{pj} may be plotted as a function of the ratio P_V/P_T. The accompanying graph shows such a curve. Also, Eq. 9 can be revised to read

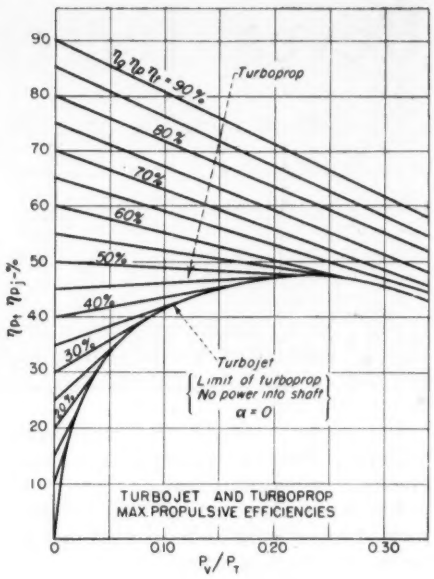
$$\eta_{pt} = \eta_g\eta_p\eta_t + 2\frac{P_V}{P_T}\left[\frac{\eta_j}{2\,\eta_g\eta_p\eta_t} - 1\right] \qquad (9a)$$

The graph also shows the value of η_{pt} plotted against P_V/P_T for various values of the product $\eta_g\eta_p\eta_t$. When numerical values are assigned to these three quantities and P_V/P_T is known, it is a simple matter to determine the propulsive efficiency of either a turbojet or a turboprop engine with the best distribution of energy between shaft and nozzle.

It will be noted from the graph that the lines representing constant values of $\eta_g\eta_p\eta_t$ have not been extended beyond the curve for the turbojet. Referring to Eq. 6, it will be seen that when all the energy is absorbed in the jet, ($\alpha = O$), the equation for turbojet efficiency will result (Eq. 7).

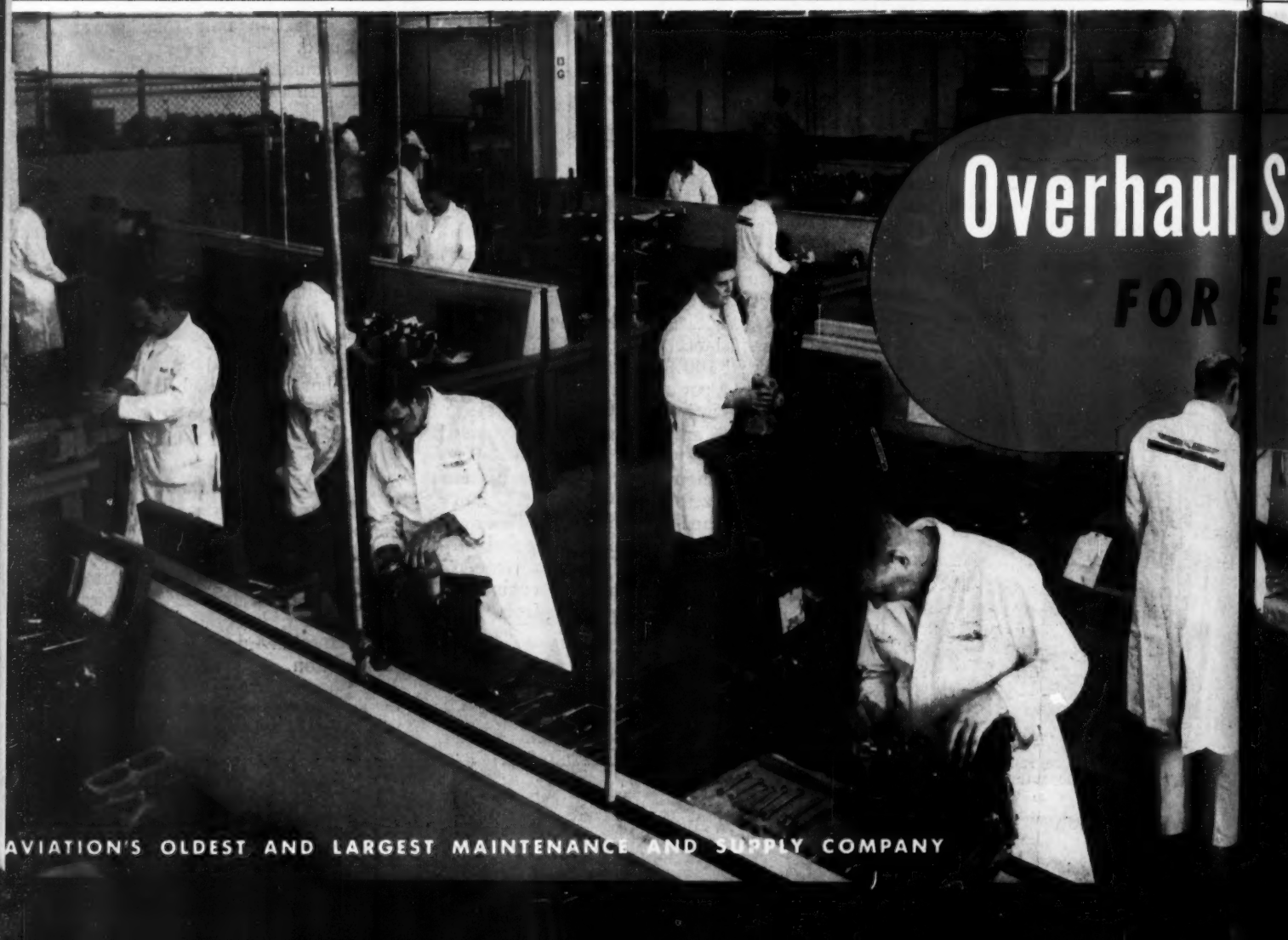
Since it is physically impossible for α to become less than zero, extension of the turboprop lines beyond the points of tangency with the turbojet curve becomes entirely imaginary and therefore cannot be used.

Security does not allow publishing of representative values for the total power, P_T, that may be obtained from various power plants. Those entitled to receive such data may readily convert engine manufacturer's thrust and power ratings to P_T by the formulas to follow. The value P_V, of course, is readily calculated from the flight speed and the mass flow of air specified by the manufacturer.



For a turbojet

$$F_n = \left(\frac{W_a + W_F}{g}\right)u_j - \frac{W_a}{g}u_o \qquad (11)$$



Then

$$P_T = \frac{W_a + W_F}{2g_o\eta_j}\left[\frac{F_n + \frac{W_a}{g}u_o}{\frac{W_a + W_F}{g}}\right]^2 \qquad (12)$$

(η_j = .95, as assumed previously.)

With a turboprop, the shaft power and residual thrust out the nozzle will be specified. The value of P_T is then calculated by

$$P_T = \frac{550\ shp.}{\eta_t\eta_g} + \frac{W_a + W_F}{2g\ \eta_j}\left[\frac{F_n + \frac{W_a}{g}u_o}{\frac{W_a + W_F}{g}}\right]^2 \qquad (13)$$

Unless the value of η_t and η_g are given by the engine manufacturer, it will be necessary to make reasonable estimates for these quantities. It is suggested that a reasonable value for this product is about .825. Likewise, .95 can be used for η_j, the same as for the turbojet.

The value for P_V is given by

$$P_V = \frac{W_a}{2g}u_o^2 \qquad (14)$$

Referring to the graph, it appears that, as P_V (or u_o) becomes large, the turbojet has the advantage, since practical values of the product $\eta_g\eta_p\eta_t$ would give lower propulsive efficiencies for the turboprop engine. This, of course, is true, if the value of P_T remains constant. Actually, the total power does not remain constant but increases with P_V. This relationship between P_T and P_V may be expressed approximately as:

$$P_T = P_{Tst} + CP_V \qquad (15)$$

C = Constant, depending upon the design of the power plant .

Therefore

$$\frac{P_V}{P_T} = \frac{1}{\frac{P_{Tst}}{P_V} + C} \qquad (16)$$

This constant, C, has an approximate value lying between 1.60 and 2.40, consequently, even with P_V very large so that the first term in the denominator of Eq. 16 approaches zero, the largest possible value of P_V/P_T is between .625 and .417.

For the usual case where P_{Tst}/P_V has a finite value, generally about 2 to 3, the total ratio, P_V/P_T, will probably be near to .25, even at very high speeds. This fact greatly changes the conclusion regarding the turboprop; at P_V/P_T = .30, the product $\eta_g\eta_p\eta_t$ equal to .55 gives the same propulsive efficiency as the jet.

With $\eta_p\eta_t$ equal to .825, as suggested previously, the propeller will need to be but 67 percent efficient. At P_V/P_T = .25, the value of η_p need be only 60.5 percent.

From this analysis, it appears that the turboprop engine may have a place in high speed operation, contrary to the usual conception. Just how important this place may be will depend upon propeller efficiencies attainable at high speed and upon the ratio P_V/P_T for any engine chosen.

Naturally, if the advantage in efficiency is small, the greater simplicity of the turbojet will probably dictate its use. Also, the lower weight of this latter type may produce a smaller and lighter airplane for the same purpose, provided that the very low propulsive efficiency at cruising (P_V/P_T low), does not cause such an increase in fuel load that the sum of the engine, fuel and tankage weights becomes excessive.

▶ **Summary**—Thus, it has been demonstrated that:

- The usual definition of turbojet propulsive efficiency cannot be compared directly with propeller efficiency, hence a change in definition of jet efficiency is necessary.
- With the definition of jet efficiency proposed here, the maximum possible value for this quantity, under conditions of no friction loss in the tailpipe or nozzle equals 50 percent, with a practical value nearer to 47½ percent.
- There exists a ratio between the power removed to drive the propeller and the total power available that will produce the maximum total thrust power with a turboprop engine.
- Employing the ratio of power divi-

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sion that gives the greatest value of η_{pt}, the turboprop may very well be considerably better than the turbojet up to speeds much higher than normally assumed.

• Considerable propeller research will be necessary before any definite decision can be reached as to the most satisfactory method of propulsion for any given airplane design problem.

If it is desired to retain the definition of efficiency as given by P_a/P_D (Eq. 4 for the turbojet) the ordinates of the graph may be divided by $1 - P_T/P_T$.

If this is done for the turbojet, for purposes of agreement with previous practice, it likewise should be done for the turboprop.

This will result in an increase in all numerical values but will not change the ratio between the turboprop and turbojet efficiencies.

Molybdenum Coated For High-Heat Use

Lack of materials with required properties for operating temperatures in excess of 1800 F. has been a restrictive factor in development of ramjets, pulsejets, turbojets, and rockets.

Availability of materials for higher temperatures than those in current use would lessen design problems, making possible, for example, increased specific power in turbo engines.

► **Research Underway**—Because requirements of stress and temperature for such increased performance are beyond the potentialities of the currently used high-temperature alloys, investigations at the National Bureau of Standards, under sponsorship of the National Advisory Committee for Aeronautics, have been directed toward development of ceramic coatings for the metals having very high melting points, to protect them against oxidation at elevated operating temperatures.

Preliminary results indicate that molybdenum with a specially designed ceramic coating offers a promising combination for very high-temperature service.*

► **Metals Considered**—Most of the usual heat-resistant alloys begin to melt when heated within the temperature range 2400 to 2600 F. Of the metals whose melting points greatly exceed this range, only such scarce materials as platinum and iridium have sufficient resistance to oxidation at high temperatures to be used without protection. Aside from the question of physical properties, cost and limited supply make their use, on a large scale, prohibitive.

* Moore, D. G., Bolz, L. H., and Harrison, W. N., NACA Technical Note 1626.

Other metals that have high-melting points, but lack adequate resistance to oxidation, include titanium (3270 F.), thorium (3350 F.), zirconium (3450 F.), boron (4150 F.), molybdenum (4750 F.), tantalum (5160 F.), and tungsten (6100 F.). Only molybdenum is available in very substantial quantities.

► **Coating Application**—The ceramic coatings developed to provide oxidation protection to molybdenum are applied in the form of water suspensions or "slips" to cleaned specimens of the metal by either dipping or spraying.

After drying, the pieces are fired at a temperature of 2150 F. in oxygen-free atmospheres.

Some of the coatings were outstanding in resistance to thermal shock while others had good resistance to high temperatures. One of the better coatings, M-13-33, consisted of a base coat of a low-expansion frit with 20 percent zirconia added, a cover coat containing 95 percent zirconia, and a seal coat comprising a thin application of the same composition as the base coat.

► **Tests Conducted**—Coated specimens were subjected to several performance tests—heating in a gas-oxygen flame, heating at constant temperature in an air atmosphere, and service trials in ramjet blast.

Results indicated that the oxidation of the molybdenum was greatly retarded by the best of the ceramic coatings which were tried.

In an air atmosphere at 1650 F., unprotected molybdenum sheet was found to decrease 0.02 in. in thickness in 30 min.

There was no decrease, however, for ceramic-coated molybdenum heated for 70 hr. under the same conditions.

At a gas temperature approximating 3500 F., giving a surface temperature on the specimen of 2600 F. or more, only short-time protection of the molybdenum was attained.

However, the oxidation rate at these high temperatures was found to be sufficiently retarded by the presence of the ceramic coating to make the use of coated molybdenum feasible for special high-temperature applications in which prolonged service is not required.

► **Present Use**—An immediate application of these ceramic coatings is the protection of molybdenum pitot tubes which are built into the nozzle end of ramjets used for pilotless aircraft.

These tubes, subjected to a gas temperature of about 3000 F., are expendable and need not last over 5 min. A simulated service test of a ceramic-coated tube indicated a life exceeding 45 min.

Other examples of equipment in which even short-time protection can be valuable include coated thermocouples and resistance thermometers made of high-melting point metals.

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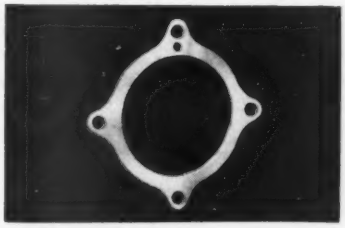

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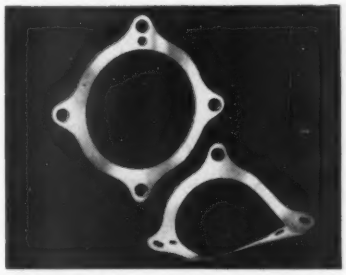

The remaining "solid" shim is always uniform in gauge, with a hard surface . . . clean and smooth as glass.

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2 All adjustments made at the job by peeling laminations. No standby lathe.

3 No fumbling and counting loose, paper-thin wafers.

4 Less compressible than ordinary one-piece or stacked shims.

5 Cut to your exact specifications. Less than 1% rejects over the years.

6 Can be fitted with babbitted lugs to prevent oil and pressure loss.

7 No new skill required for use.

8 Your customer recognizes the plus value of less "down time" for maintenance and adjustment.

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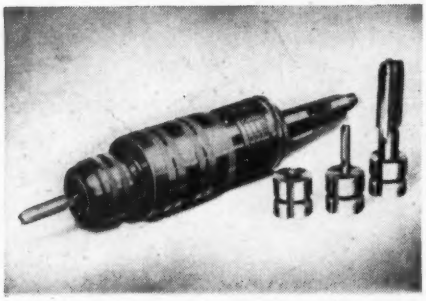
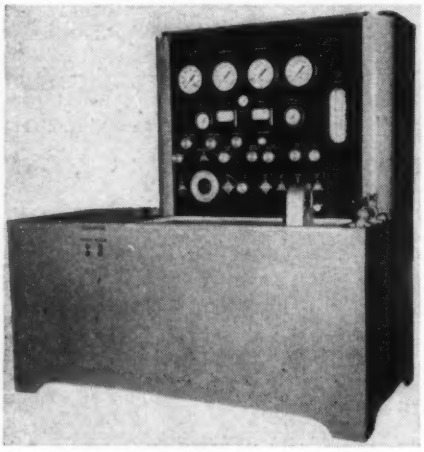
NEW AVIATION PRODUCTS



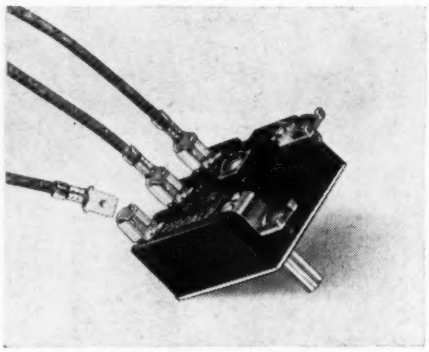
Protects Taps

Tapping attachment, "Jay-Dee," designed to eliminate costly tool breakage, is announced by **Wickman Mfg. Co.**, 15533 Woodrow Wilson Ave., Detroit 3, Mich. Device employs resilient material to deliver safe cutting torque and protect tap regardless of load. Four index stations, listed according to tap size on body attachment, can be selected quickly and provide positive setting for wide variety of materials. Tap changing requires no wrenches. Adaptors, supplied for various size taps, are held in place by spring buttons. Lubricant recharging is at three-month intervals. Unit is available in three models, all with Morse taper shanks: 16½ in. long, 16½ lb., ¼-1¾-in. USS range; 13¾ in. 11 lb., ⅜-1¼-in. USS; and 10 in., 3½ lb., $\frac{5}{16}$-½-in. USS.



Tests Hydraulic Units

Hydraulic pump and motor test stand, Model PA 835-A, is announced by **Pacific Airmotive Corp.**, 2940 N. Hollywood Way, Burbank, Calif. Stand is specifically designed for checking variable-displacement and fixed-displacement pumps and fixed-displacement hydraulic motors as used on Convair-Liner, Douglas DC-6, and Lockheed 749, Constellation. Hydraulic motors are checked with flow from variable-displacement pump and loaded by fixed-displacement pump. Power is supplied by a 3600-rpm., constant-speed, heavy-duty, 50-hp., three-phase electric motor. Low-pressure pump (35 gpm.) provides supercharged pressure to pump-intake port at pressures up to 120 psi. Complete system is protected with filter installation containing AN-type elements for aircraft hydraulic fluid. Instrumentation includes three 0-5000 psi. gages, one 0-30 vacuum and 0-160 psi. input gage, direct-reading flowmeter to 2400 gph. and two 0-4000 rpm. tachometers. Accessories furnished include yoke-plate and valve-plate fixtures, and set of hoses with connector adapters.

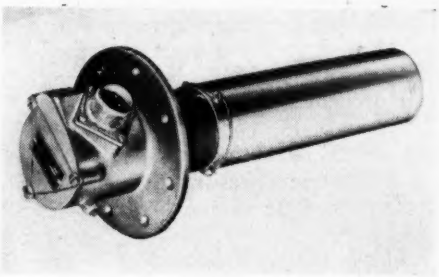


Wiring Connector

Disconnect terminal designed to speed wiring of electrical equipment has been developed by **Ark-Les Switch Corp.**, 41 Water St., Watertown, Mass. Flat blade, staked to the connecting wire, snaps into a rigid receptacle and is retained by spring pressure. Low contact resistance is via flat construction providing ¼ × ⅜-in. contact surface. Hole-and-dimple construction guards against accidental uncoupling of the parts. Stationary female contact terminal is available bent at desired angle for convenience in inserting lead wire terminal. Contacts are brass, stainless steel or Monel metal.

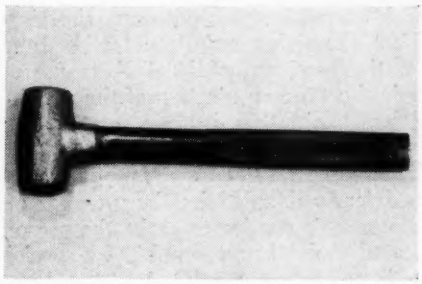
Coating Remover

Material for removing paint, lacquer, primer, synthetic enamel, baked and air-dried varnish, is made by **Magnus Chemical Co., Inc.**, Garwood, N. J. Known as Stripit, product is stated to remove, under normal conditions, at least three coats of paint in one application, first coat beginning to pucker in 1 to 5 min. It's claimed that ordinarily, cutting stream of water directed on the surface will remove all loosened paint in few minutes. Material does not require addition of acids or thickeners, mixing, stirring or other handling, and is nonflammable. Heavy-bodied, and clinging to vertical or inverted surfaces, liquid is slow to evaporate and can be left on for longer periods without becoming set or hard to rinse off.



Fuel System Float Switch

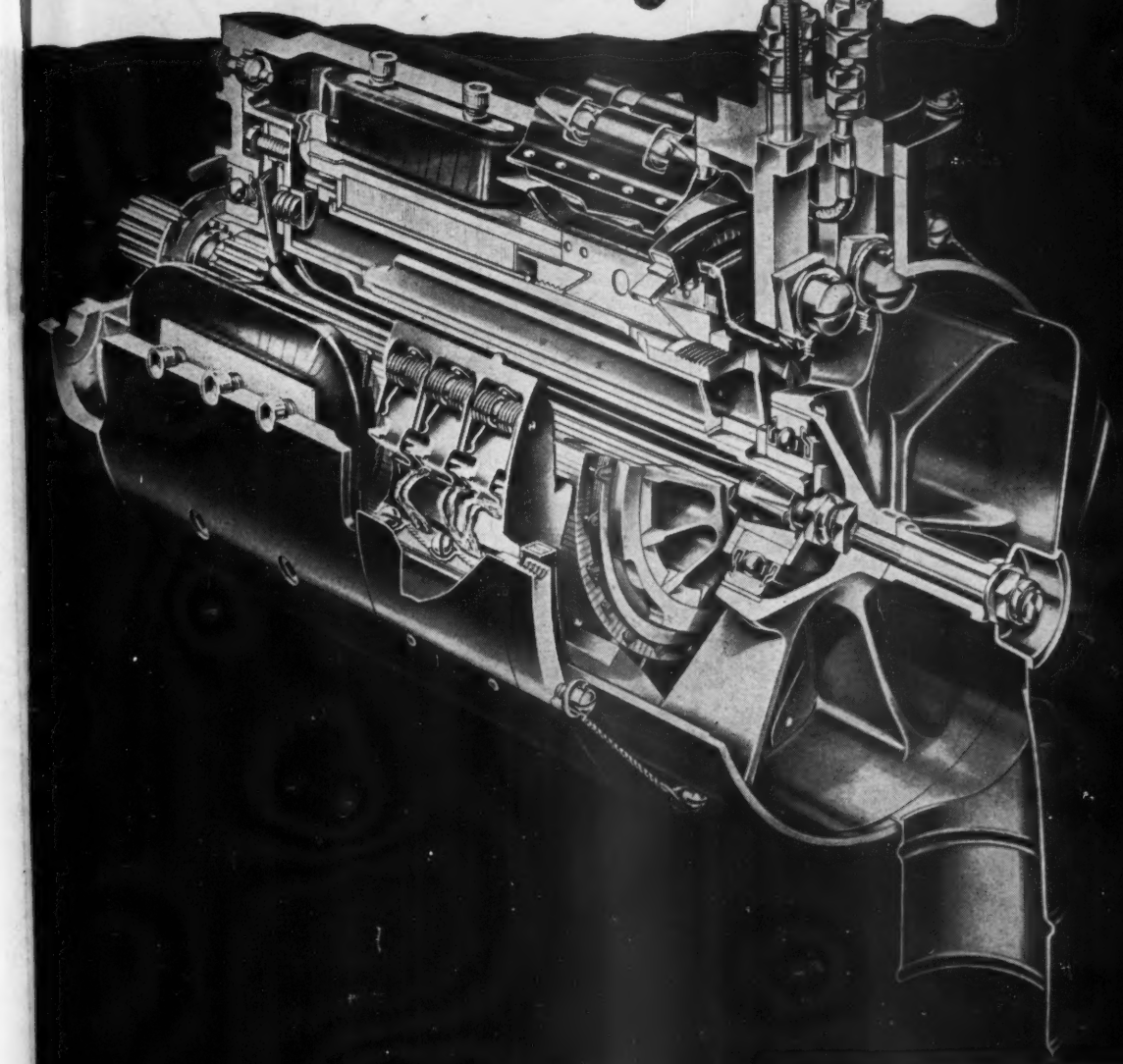
New switch with float in tube is announced by **Hydro-Aire, Inc.**, 3000 Winona Ave., Burbank, Calif. Device is designed to eliminate hazards of jamming, bending and accidental operation in fast dives or climbs, and is stated to be unaffected by sloshing of fuel, assuring high accuracy. Features include fully-enclosed electrical circuit, minimum space and clearance requirements, wide adjustment range, easy external adjustment after installation and suitability for top, bottom or side mountings. The 10-amp. switch is Air Force-approved and is built to operate in fuel systems without the addition of relays.

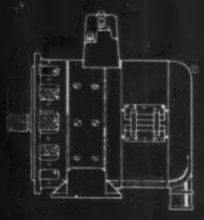


Soft Hammer

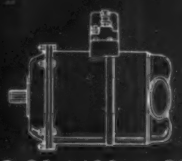
Adaptable for assembly of various aircraft units, including engine parts, axles, transmissions and for work in screw-machine, die and tool shops, soft hammer having formed tubular steel handle and diamond knurled grip is offered by **Univertical Machine Co.**, 14831 W. Eleven Mile Road, Royal Oak, Mich. Head of homogeneous brass or copper casting, which will mushroom but not fracture, is molded right on the end of handle crimped into butterfly to eliminate wedges. Hammer is available in ¼, 1, 1½, 2, 2½, 3, 4, 5 and 6-lb. sizes.

5 Gs for you!

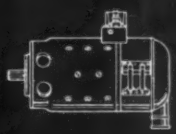




G-32—500 AMPS.



G-29—400 AMPS.



G-28—300 AMPS.

G-26—200 AMPS.

G-25—100 AMPS.

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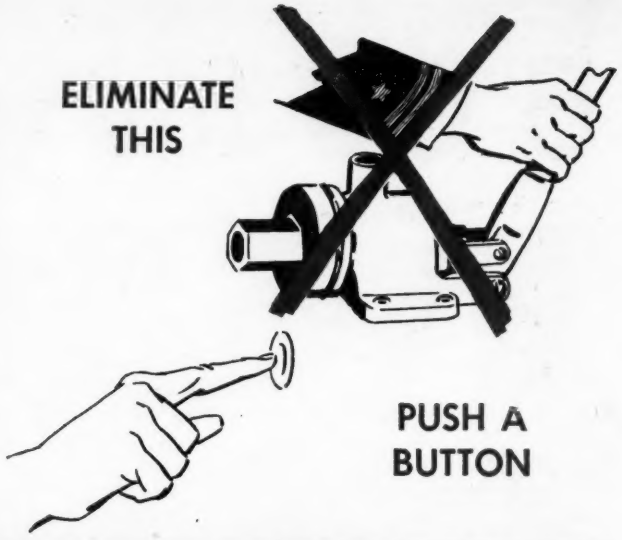

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BOAC to Get Entry to Yokohama

Approval of airline's request for second landing port likely to bring rush of similar applications.

TOKYO—Approval of BOAC's request to operate its flying boat service to Yokohama, the port for Tokyo, will open the gates to a rapid extension of commercial air service into Japan.

Granting of approval will provide BOAC with two ports of entry and exit to Japan. Northwest Airlines and Pan American World Airways can be expected to follow this with requests for similar privileges.

▶ **Others**—In addition, other international carriers not now flying into Japan will press for approval of applications for entry. Many such requests have been in the mill for months but without any serious pressure being exerted to push them through. However, the opportunity for double entry to Japan giving two points for generating business will make operations much more attractive.

BOAC has received verbal approval from SCAP (Supreme Commander for the Allied Powers) for permission to use Yokohama as a port of entry to Japan. SCAP now is drafting the final written approval.

One difficulty has been the granting of entry and exit rights at two points—Yokohama and Iwakuni, where BOAC now is operating. Iwakuni is the major airport serving the headquarters of British Commonwealth Occupation Forces. BOAC certainly will not abandon that service. But many Empire officials and all businessmen must come to Tokyo, headquarters of SCAP and of Japanese trade.

Thus there is considerable legitimacy to BOAC's request for landing rights at Yokohama, the port nearest Tokyo. However, all other international carriers should be entitled to similar treatment; that is, the granting of two points for the generation of traffic.

▶ **Surprise**—Originally, it was thought Northwest and Pan American would want Fukuoka as their second stop after Haneda (Tokyo). Northwest has come up with a semi-surprise by applying for permission to tap the Osaka industrial region via Itami Air Base. Pan American probably will follow suit.

Osaka's attractiveness lies in its importance as an export center. Certainly for the next few years, its many small industries producing foreign trade items will make it a more attractive business spot for airlines than Fukuoka. Later, Fukuoka as center of Japanese heavy industry may assume a more important place in the country's commercial air operations.

▶ **No Excuse**—French and Netherlands missions in Japan are pushing the applications of Air France and KLM. KLM made application to SCAP over three months ago but has not received a firm reply. It has been told that there aren't sufficient facilities available at Haneda. This reason is being rejected as insufficient, according to the Netherlands Military Mission.

Actually, even the new terminal put up by MATS (Military Air Transport Service) would be crowded if all airlines who want to begin service to Japan were granted permission. There is, of course, adequate space at Haneda for developing an international air terminal, and the time is drawing near when something will have to be done.

In the beginning, carriers would not be permitted to transport passengers between two points in Japan. That ruling, however, probably would not last long. U. S. carriers are questioning whether such a prohibition would fall under cabotage rulings, since there is no Japanese airline with which they would be competing. In fact, there can be no Japanese airline under existing Allied policies. The Japanese lost their right to fly as a result of the war.

Consequently, it is legitimate to speculate on there being strong requests to provide passenger service for specified groups of personnel. Foreign traders, for instance, would much prefer to travel between Tokyo and Osaka by air than by train. The flight to Osaka would take about two hours, and the fare would be about $12.50.

Air-India to East Africa

BOMBAY—Next route for Air-India International, government-controlled and privately run Indian flag carrier, will be from Cairo to Nairobi, East Africa.

East Africa has a heavy Indian population and traffic between there and India has been good enough to support frequent nonscheduled operations by Indian Overseas Airlines. Recently Indian Overseas announced it was planning to put two Skymasters to work on the service. Under the single flag-carrier system adopted by India, this line may be shoved out into the cold.

TESTING BRITAIN'S NEW PROPJET

Visitors to the Society of British Aircraft Constructors show saw this test installation of the Napier Naiad 1500-hp. propjet engine in the nose of an Avro Lincoln bomber. In addition to the shaft horsepower, the engine gives 240 lb. static thrust. The Naiad has a diameter of 28 in., length of 102 in., twelve compressor stages, five combustion chambers and a two-stage turbine. Dry weight is 1095 lb. Fuel consumption is .732 lb./lb. thrust/hr. The four-bladed propeller with ducted spinner was designed by Constant Speed Airscrews, Ltd., in collaboration with Napier. Later versions of this propeller installation will employ a new system whereby the original airfoil-section blade root fairings will be replaced by circular fairings supporting the outer shell, leaving the annular intake free from obstruction.

Pilot Health: Accident Factor?

Survey finds little if any relationship between the two; points up inadequacy of air medical standards.

Inadequacy of present aviation medical standards for aviation flight personnel is indicated in a series of research studies made on relation of such standards to accidents and pilot ability, an AVIATION WEEK analysis discloses.

Latest of a group of technical studies relating to flight personnel physical standards is reported by the British Flying Personnel Research Committee. The work of Sir Alan Rook, RAF consultant in medicine, it bears out earlier research studies made in this country.

The Rook study reports the results of tests made over the last 10 years on 106 candidates with sub-standard physical ratings accepted for pilot duties in the RAF as compared to 103 other candidates with normal physical ratings also accepted at the same time.

Some results:

• It was found that physical efficiency tests gave little or no indication of those candidates likely to be rejected during training and that a low grade of physical efficiency at a first examination was no cause for rejection since, in most cases, physical improvement soon followed when living conditions improved.

Considerable difficulty was met in attempting to judge success or failure in their subsequent careers. There was no evidence that the controls (men with normal physical ratings) proved better wartime pilots than did the observation (sub-standard) cases. Comparison of the war records of the two groups revealed little difference in the survival and casualty rates.

► **U. S. Studies**—American studies which bear on the same subject have largely been the work of the Civil Aeronautics Administration and the National Research Council's committee on aviation psychology.

Dr. Dean R. Brimhall, assistant to the CAA administrator for research, has taken cognizance of the gap between existing aviation medical standards and the relation of those standards to accidents in several studies.

Dr. Brimhall and Raymond Franzen reported a study in 1942 based on CAA medical division records of 18,400 pilot cases who had been examined by more than one physician and for whom defects had been reported in one of their last 10 examinations. Results showed generally that there was a large range in the severity with which physicians conducted pilot examinations and that examiners differed in the emphasis which they placed on certain defects. In many cases defects found important enough to disqualify a pilot in one examination were ignored in other examinations. The study concluded that there was a need for standardized tests and standardized methods of examination.

► **Another Study**—About the same time, they released another study on relation to accidents of physical defects noted in standard medical examinations.

The researchers reported: "Literature of aviation medicine abounds in reference to a reputed relation between detected physical defect and accidents but previous reports have likely been made on insufficient data to justify broad assertions in this regard. Considerable doubt still remains on the direct interrelation of physical defect to accident."

They studied reports for each of the following defects: visual acuity, depth perception, eye muscle balance, central color vision, hearing, structural, cardiovascular, and psychiatric.

"Although five years were covered in this survey, and every method was taken to secure the greatest advantage of the data available, it is impossible to adduce that there is a direct relation of physical defect to accident," they reported.

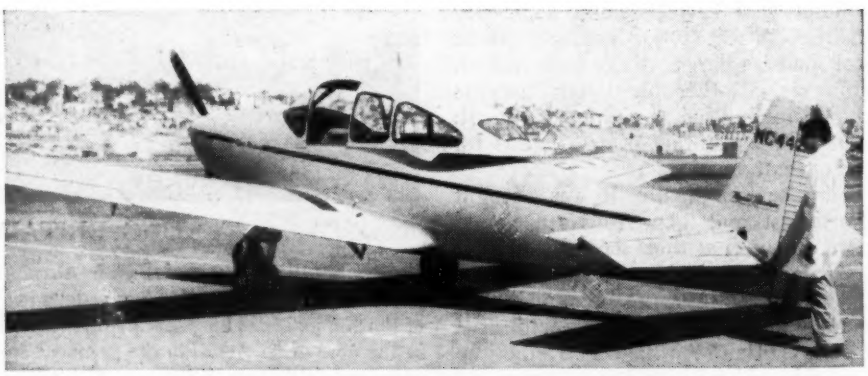
Yet a third Franzen-Brimhall study was based on 1286 pilots who had completed primary training and had been medically certified for the secondary stage of Civilian Pilot Training. AAF medical officers examined 925 of these students and they disqualified almost half of them.

► **Service Results**—Navy medical officers examined 361 and disqualified about one-fourth. Analysis disclosed that despite the discrepancy in the CPT, Army and Navy examinations, the same standards were employed by both sets of examiners. The study showed that of disqualifying defects noted, only 16 percent were recorded as the same by two examiners. In these cases there was agreement as to defect and its severity but Army and Navy examiners considered it a flying handicap, whereas the CPT examiners had not. Army rate of disqualification was found to be twice as high as the Navy rate.

Dr. Morris S. Viteles, University of Pennsylvania professor of psychology and chairman of the National Research Council's committee on aviation psychology, reported findings of a study on visual standards and flight performance of two groups of selected pilot trainees at Ohio State University, previously reported in AVIATION WEEK. This study involved a control group with normal 20/20 vision and three groups with varying degrees of visual defects. These defects ranged down to students with as bad as 20/100 or worse corrected by glasses to 20/50 or better, and in some cases with only one eye.

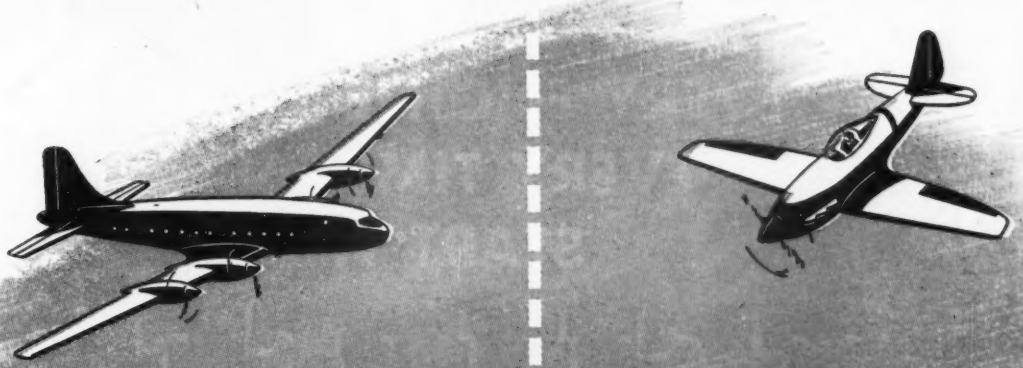
While there was a definite relationship between visual efficiency and flight performance, all subjects with visual defects did not fail to attain acceptable flight proficiency. In addition, 22 percent of the subjects in the group with the worst eyes made scores equal to or better than the average of the subjects with normal eyesight.

► **CAA Results**—Dr. Brimhall also has reported on a CAA study made into the case records of a group of physically



ONE MAN GROUND HANDLING

How one man can best ground handle a Ryan Navion is illustrated in this picture sent out by the manufacturer. Ground crewman pushes down with his foot on the tail-skid and swings nose to left by pushing tail to right. Once the plane is headed properly, he pushes it or pulls it by grasping the rudder horns.



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For Engines Up To	Input Voltage	Weight	Type No.
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1000 cu. in. disp.	24 V. DC	19 lbs.	756
2000 cu. in. disp.	12 V. DC	27 lbs.	38E09
2000 cu. in. disp.	24 V. DC	27 lbs.	38E09
3360 cu. in. disp.	24 V. DC	28.75 lbs.	1560*
4360 cu. in. disp.	115/208, 3 phase, 400 cycle	28.50 lbs.	18E48*

*For engine jaw to crankshaft ratio of 3:1.

JET ENGINES

Starter H.P. Nominal	Starter H.P. Peak	Input Voltage	Weight	Type No.
10	13	24 V. DC	27.75 lbs.	1496
17.5	24	28 V. DC at 1000 amps.	61.0 lbs.	38E04

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deficient pilots who were finally granted pilot licenses by CAB waiver of these physical defects. In many cases these waivers were issued over the recommendation of the CAA medical division against granting licenses. A study of 36 of these physically deficient pilots, as compared to 75 normal pilots chosen for similar comparable circumstances, showed more of the control group reported having had accidents than the physical defect group, and that more of the physical defect group reported coming close to having an accident which they avoided than the others.

Compilation of findings of the several studies offers substantial evidence leading to the conclusion that aviation medical standards relating to flight personnel are not directly related to accident rates. Research to determine some other method of evaluating physical standards is due for development.

Noise Kills County Program

Waukesha, Wis., county board has killed a $250,000 county airport expansion program and snubbed a federal government offer of financial aid because of airplane noise.

By a 30 to 19 vote, the board postponed indefinitely a resolution designating the state aeronautics commission as its agent in expanding the airport for light commercial purposes, in effect killing the project.

The federal government had offered $119,000 in aid for the airport and the state aeronautics commission had approved a grant of $65,000, subject to approval by the legislature. The county would have had to appropriate $65,500 as its share, but officials of the city of Waukesha had indicated the city was willing to take part of that expense.

The expansion program would have provided for lengthening one runway to permit use of the field by commercial planes, would have paved the runways, and would have lighted the field.

Board members expressed concern about the noise of planes which affected inmates of the nearby county home and asylum. Trustees opposed the expansion plan, complaining that the planes "seriously disturbed" the inmates.

Bobcats for Ethiopia

Ethiopia's air force has purchased three twin-engine Cessna Bobcats from the Babb Co., Inc., New York, for use as advance trainers at the country's air school in Addis Ababa. Plan is for military pilots to be trained with these craft, then be available for operations on Ethiopian International Airways.

Cessna Bobcats were chosen at the suggestion of the Swedish instructors at the school.

BRIEFING FOR DEALERS & DISTRIBUTORS

NON-AVIATION REVENUE AT AIRPORTS—Study of a wide variety of non-aviation commercial activities at war surplus airports inherited by small but enterprising communities in various sections of the country indicates that many of the large so-called "white elephant" military fields are actually assets to their community and are returning annual profits.

CAA reports that 357 military airports declared surplus have been turned over to their neighboring communities (as of Aug. 31) and many of the communities are making use of the recently enacted amendment to the Surplus Property Act which authorizes transfer of property for non-aviation revenue at such airports.

Liberal, Kan., (pop. 8600) reported revenue of $26,000 above the cost of operation of its big USAF surplus base from July 1947 to Aug. 1948. Bulk came from such non-aviation activities as lease of eight large warehouses, operation of a nine hole golf course, a lighted baseball diamond, and buildings for fairs, expositions and other public gatherings. Two flight operators have leased operations on the field.

Savannah, Ga., has leased buildings on the former Hunter Field to a transportation equipment company, a cold storage company, an awning company, and other enterprises ranging from a kindergarten to a shooting range. It reports an excess of $50,000 in rentals above maintenance costs at the airport. Similar reports are coming in from other cities which have taken over other large airports.

MATTERN GAGE—Jimmie Mattern, well-known round-the-world flyer and test pilot, is heading the new Jimmie Mattern Co., P. O. Box 281, Burbank, Calif., which is marketing a "course and mile gage" developed by the flyer. The multi-featured pocket size aluminum instrument is basically a pair of dividers designed to show automatically direct mileage readings for any aerial map without additional computation, and provides the compass course serving as a protractor.

AIR BLAST HAZARD—The air blast from propellers of a Northwest Airlines DC-4 at Milwaukee has led to a damage suit filed against the airlines by E. Merritt Anderson, head of Anderson Air Activities, flight school operator at Billy Mitchell Field.

Complaint says that an Aeronca trainer, piloted by an instructor and carrying a student, was cleared by the tower to taxi from a runway to an administration building. The taxiing route took the trainer plane behind the Northwest plane, which revved up its engines just as the lightplane passed. The blast flipped up the Aeronca on one wingtip, causing $93 damage to the plane but no injuries to occupants. Anderson asks recovery of the $93 damage caused to plane.

MILWAUKEE SPRAY CAMPAIGN—Milwaukee Common Council has asked health authorities to investigate possibility of combining an insecticide aerial spraying campaign against flies and mosquitoes with the city's tree spraying aerial campaign against insect pests which destroy vegetation. Dr. E. R. Krumbiegel says an effective control program on flies and mosquitoes could be carried on with four sprayings a year, at about $15,000 each.

FARMERS ON AERIAL TRAIL—One of the largest mass flights of the National Flying Farmers Association—approximately 1000 planes—is expected this week to retrace aerially the famous old Chisholm Cattle Trail, starting at Gainesville, Tex., and ending at Dodge City, Kan. Governors of the four states of Kansas, Texas, Oklahoma and Colorado will participate in ceremonies along the way during the three day event, Nov. 16, 17, 18.

Starr Nelson, 82-year-old Colorado rancher and Fircoupe pilot, oldest active member of the Flying Farmers, will lead the flight. When Nelson drove a herd of cattle up the Trail in 1884 it took approximately four months. The Flying Farmers' cavalcade expects to do the same trip in approximately four hours flying time.

ALEXANDER McSURELY

A GREAT NEW AVIATION SPARK PLUG

With Rugged, One-Piece Aluminum Oxide Insulator

Currently Approved by Pratt and Whitney and Civil Aeronautics Authority for the following Engines:

Hornet E-3	**(R-1690)**
Twin Wasp C	**(R-1830)**
Twin Wasp D	**(R-2000)**
Double Wasp	**(R-2800)**
Wasp Major	**(R-4360)**

Better performance at higher ceilings—positive firing with leaner fuel mixtures—preignition rating for high output engines—longer life, with less gap wear—improved flash-over characteristics — easier cleaning and servicing — these are among the many advantages provided by this latest engineering triumph, the AC-181 Aviation Spark Plug.

Electrodes are of heavy platinum alloy. The built-in resistor insures maximum spark plug life. The rugged, one-piece aluminum oxide insulator gives positive insulation between the core pin and the shielding barrel, and prevents downward flash-over. It also eliminates the dirt trap between the core insulator and the shielding barrel insulator which is found in conventional designs. Pure silver, centrifugally cast directly into the insulator, conducts heat away from the firing end.

Increased clearance around the insulator results in better scavenging. One-piece plug assembly prevents loosening from vibration. AC heat seal ensures gastight assembly. Shell and threads are zinc-plated.

Neither expense nor ingenuity has been spared to give this new AC *utmost reliability*. It's the biggest news in aviation spark plugs—and it's available now.

AC
SPARK PLUG
DIVISION,
GENERAL MOTORS
CORPORATION,
FLINT, MICHIGAN

AC AVIATION **SPARK PLUGS**

1948 Market Reaction

	1948 Range To Nov. 1, '48 High	Low	Closing Price Nov. 1, '48	Closing Price Nov. 6, '48
American	10	6⅛	7⅜	6⅞
Braniff	10¼	7⅛	8¼	7⅜
Capital	8⅜	3⅞	6⅜	5⅜
C&S	7¾	5⅛	6¼*	6¼*
Colonial	9⅛	6⅛	6⅜	5⅜*
Eastern	20⅝	13⅞	16	14⅞
National	10¼	4½	6⅛	5½
Northeast	3⅜	2⅛	2⅜	2½*
Northwest	17⅜	9⅜	9⅞	9⅛
Pan American	11½	8⅜	9½	8⅜
TWA	22⅜	12	14⅜	13¼
United	19¼	10⅝	13¼	11⅝
Western	10½	6⅜	7	6⅜

* Bid price or previous day close.

Election Effects On Airline Stock

Despite its individual characteristics, air transport's securities will follow general economic trends.

Airline equities followed declining price tendencies in the general post-election market collapse.

This action came at a particularly bad time as there were increasing indications of broadening investment interest in air carrier securities.

The election discredited, in the popular mind, forecasting and prognostication. But many observers still are inclined to believe the market collapse was due to emotional forces set in action by acceptance of advance predictions of what the election would mean to business. Fears of all sorts of restraints, including excess profits taxes, were conjured up as factors which might take a heavy toll of corporate earnings. This hurried conjecture is not shared by more sophisticated investors who prefer to wait and see what the future will bring before ascribing reasons for past performances.

▶ **Market as Barometer**—Yet the market was doing nothing more than acting in the traditional role as barometer of coming events. Frequently however, as the future is discounted, sharp adjustments occur in the market to place appraisals on a more realistic basis.

In due time, the market action will adjust itself to more normal tendencies and attempt to forecast future trends of the separate industries as it has in the past.

The inter-relation of the airlines with the general welfare of the country is evident in many ways. A high rate of industrial activity creates considerable movement of personnel and property. Time becomes a very important element and provides a material source of business for the air carriers.

▶ **Increased Interest Seen**—As monthly earnings have been revealed recently, there was an increasing interest in air transport securities. Market atmosphere was conducive to a change. Any group which has been selling at depressed levels for any extended period of time is always an excellent candidate for speculative selection, hoping for a reversal in trend.

From Jan. 2, 1948 to mid-October, a recognized index of 65 stocks rose about 5.5 percent. While this was going on, the air transport group index declined almost 13 percent. In the weeks preceding the election, broadening interest was reflected in the air transport group which was virtually at the year's low point, a condition induced in part by early tax selling.

▶ **Market Range Shown**—The accompanying table reveals the market range for all listed air carrier common shares for the first ten months of this year. Also shown are the prices as of November 1, the day preceding the election and which, generally speaking, represented the recent recovery high point for most of these issues. Completing the presentation are November 6 prices which reflect the results after a severe setback and a mild attempt at a post-election recovery. By no means is it implied that the market reaction may have run its course and greater stability is now in store. The relative positions within a matter of days does show, however, effects of the initial burst of emotion following the election.

Shifts in valuation levels are also significant. On November 3, in an initial sale of the day, Eastern Air Lines fell in market price from $16 to $14 a share.

With about 2,396,000 shares outstanding, this would imply that about $4,792,000 of the company's market valuation was wiped away. Actually the company's resources were virtually unchanged during this short period.

Similarly, the decline of 50 cents a share for American Airlines common stock from Nov. 1 to Nov. 6 would imply an evaporation of $3,275,000. Fortunately for the company no such impairment was suffered in its assets.

▶ **Outlook Reflected**—Market quotations merely attempt to reflect the outlook for the individual companies at a given time. Past experience has demonstrated that separate industrial groups have their peculiar trend movements and individual units within a group have a distinct selective pattern of their own.

For this reason it is understandable why, for example, public utility stocks were particularly weak as a result of the election returns. A change of administration held the definite hope that a more lenient federal policy would be accorded the utilities. This expectation was rudely shattered.

▶ **What Effect?**—On the other hand, it is less understandable why the air carriers would have been affected either way, regardless of who won the election. At no time in the campaign were the airlines an issue. It is true that many airline officials were fervently hoping for a change and it is presumed that such an adjustment would have been more psychological than real.

Certainly, no wholesale revamping of the Civil Aeronautics Board or its policies were indicated by a new administration.

The only real relation the election bore to the future of air transport was the relation it bore to business in general. Because it is a part of the national economy, air transport will be affected by any general economic trends that stem from the election.

In viewing the industry it is far more important to concentrate on the actual progress being made. The recovery process is slow and torturous, but it is taking place. There are few ailments of the industry that can not be cured by profitable operations. With such an accomplishment, regardless of shifting political tides, the air carriers can be masters of their own destiny. —**Selig Altschul**

"Give us the tools..."

TO SURVIVE

America Must Have Better Tools

IN THE past twenty years the United States has failed to provide its workers with enough new tools and equipment.

To most Americans this statement will come as a shock—or will be doubted. We are quite complacent about our industrial equipment, for easily understood reasons.

Throughout the '30s we heard continuously the propaganda line that the United States had become a "mature economy." The job of equipping America with industrial plants and tools was said to be largely done.

Now, knowing that industry is spending billions to expand and rebuild its plants, many people assume that the result must be a first-class industrial system.

A further powerful inducement to complacency is the vastly *worse* industrial condition of most of the rest of the world. When Americans look abroad in almost any direction they see shattered plants and equipment. A natural reaction is that we are sitting pretty.

That is a dangerous reaction. Between depression and war, we have failed to build the tools and equipment we need. This condition is dangerous for three reasons:

1. *From bitter experience we know that national security depends first and foremost on the capacity and readiness of our industrial equipment.*

All of our plans for stabilizing prosperity assume a world at peace. The greatest menace to peace would be an unarmed America, unable or unwilling to keep herself strong and ready for defense—strong in spirit, in resources and in the all-important industrial plant and equipment.

2. *Whether Americans live well—or badly—depends directly on the kind and quality of tools used by American workmen.*

This is true for all workers, and for every worker—from a garage mechanic and his wrenches to a steel mill gang and its rolling equipment. In a monumental study of "America's Needs and Resources" the Twentieth Century Fund found this fact: The improvement in the real income of the American people has more consistently followed the amount of power used in industry than anything else. What the workman worked *with* determined, more than any other factor, the size of his pay envelope, and what it would buy.

3. *Our success in stabilizing prosperity will depend largely on what we do about building new tools and equipment.*

About 30% of our industrial workers are employed in producing tools and equipment. Steady employment for them is essential to our over-all prosperity.

How far have we fallen behind in providing new plants and equipment?

Estimates vary. Here is one rough estimate: If we had built new industrial facilities during 1930-48 at the rate we did in the prosperous '20s, we would have spent at least $100 billion more than actually we did.

To get a better and more complete measure of this deficit, McGraw-Hill is undertaking a survey of American Business' Needs for New Plant and Equipment.

Businessmen all over the nation are being asked to answer questions like this: How much

money would you need to put your plant in first class condition? How much are you planning to spend for new plant and equipment? Where do you expect to raise the money? The results will be reported later in this editorial series. Already the survey shows we have fallen many billions of dollars behind.

Some shortcomings are apparent to everyone. They are revealed in a lot of rickety transportation facilities and in rundown buildings.

Many other deficiencies do not come into general view. They are, for example, the antiquated machines in our plants. Of the privately-owned machine tools in use in 1945—when the last census of metalworking equipment was made by AMERICAN MACHINIST—54% were more than 10 years old. Their average age is higher today.

It is true that in recent years we have hit new highs in total national production. But we have done so by putting far more people to work than ever worked before . . . and by driving equipment to the limit of its waning endurance, sometimes beyond. It has not been done *primarily* in what is by all odds the best way to increase production—to use more and better and more modern tools and equipment.

Haven't we overcome much of this twenty-year deficit by rushing to build new plants since the end of the war?

No. For two clear-cut reasons:

1. The accumulated shortage is tremendous. The total of about $40 billion, which has been spent for industrial plant and equipment since VJ-Day, has not wiped it out.

2. Some key industries have had difficulty in getting the facilities they need. Take steel, for example—the industry that turns out our most basic industrial material. Its needs for new equipment are measured in billions of dollars. To pay for that equipment, it should have *risk capital*—money which people are willing to invest with a risk of losing for the sake of gain. For steel is an up-and-down industry. Earnings on its common stocks inevitably share both ways in those ups-and-downs.

Since the war, steel, in common with most of industry has been unable to market new common stock successfully. Its outstanding stock is now selling for only about one-half the current net worth of the industry's present assets. With investors willing to pay only 50 cents on the dollar for its facilities, the industry can not readily sell stock to pay for *new* plant and equipment—at higher prices even than the old.

Why can't steel—and other industries—attract people who are willing to risk their money retooling America?

The full answer to that serious question must be left to future editorials in this series, for it involves many things . . . tax reform . . . mobilization of small savings . . . a new respect for corporate profits.

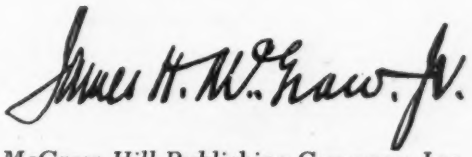
This first editorial seeks simply to emphasize two fundamentals:

First, our standard of living improves with the *quality* of our industrial equipment.

Second, American industry and American workmen badly need billions of dollars worth of better equipment *now*.

The American people must understand that *not only our continued prosperity but also our security as a nation depends upon giving American industry more and better equipment.*

"Give us the tools." This was Winston Churchill's cry for help to win the war. Only if we give American industry new and better tools will we have a chance to win abiding prosperity at home and good order abroad.



President, McGraw-Hill Publishing Company, Inc.

★ THIS EDITORIAL, and a series to follow, will be devoted to a single problem—how to provide American industry with the equipment needed to improve that envy of the world, the American standard of living. No more important problem confronts us today. Upon our wisdom in handling it depends not only the degree of our prosperity, but also our security as a nation.

THIS IS THE 69TH OF A SERIES

How Airlines Can Lease Convairs

Here, for the first time, are Convair Equipment Corp. proposals, now circulating among the airlines.

If Consolidated Vultee Aircraft Corp. is successful in setting up its plane leasing subsidiary (AVIATION WEEK, Oct. 4), how would an airline deal with the new company, the Convair Equipment Corp.?

Airlines are now studying the firm leasing proposals which, it is learned by AVIATION WEEK, are designed to:

- Provide sufficient revenue from lease to cover depreciation charges on the aircraft, service charges on the capital, operating expenses of the equipment corporation, plus a "reasonable" profit for the common stock.
- Provide all of the necessary aircraft and spare equipment to the lessee for the operation of Convair-Liners over that lessee's system.
- Provide a flexible arrangement whereby airline lessees have an option to purchase the aircraft leased on terms favorable to such an airline.

In addition to the airplanes under firm lease, Convair Equipment Corp. will make available to the airline lessee at any time one Convair-Liner for each ten under firm lease, at the rate of $1000 per day. This arrangement is intended to provide for peak traffic loads and emergency situations requiring the airline to use such temporary aircraft to maintain its normal schedules or to extend schedules to cover peak periods which cannot be handled by normal equipment.

► **Four-Year Term**—The airplanes would be leased to the airlines under a firm lease covering a period of four years.

Rental of the aircraft would be $7000 per month per plane, plus ¼ cent per revenue passenger mile flown by each unit. In addition, the airline will be required to pay $20 for each hour by which each aircraft fails to fly 250 hours per month in scheduled passenger service and $20 for each hour it flies in revenue service other than scheduled passenger service. Spare engines would be leased at $500 per month each and spare propellers at $175 per month per propeller.

The airline agrees to maintain the aircraft just as if it owned the equipment. It would bear all costs of such maintenance. It would pay all property and other taxes associated with the aircraft and its spare parts.

► **Purchase Option**—The airline also would have option to purchase any or all of the aircraft at a figure determined by the initial price Convair Equipment Corp. paid in each instance, less reasonable depreciation. Reasonable depreciation is determined on the basis of a six-year period with a 10 percent residual, plus additional depreciation equal to $16 for each hour over 3000 which each aircraft flies in scheduled service each year, plus an amount equal to $1000 for each 1 percent by which the annual revenue passenger load factor experienced on each aircraft exceeds 50 percent.

The purchase option extended to the lessee is to be exercised at any time within the first three years after delivery of the aircraft to the lessee. The equipment company must be given six months notice by the lessee of intent to exercise the purchase option. The purchasing airline also would agree to purchase all spares, including engine and propeller spares. Purchases under the option would be for cash.

► **Same as Ownership**—The sponsors of this leasing plan emphasize that these arrangements provide the means whereby the airline receives all aircraft and spares necessary for operation of Convair-Liners over its route system. Further, operation under the plan during the lease period places the airline in the same position as that of ownership except during the lease period. It does not incur depreciation and interest charges on capital invested in the equipment, as lease charges are essentially a substitute.

The option price to the airline during the three-year period is represented as on the basis of the reasonable depreciated value of the aircraft. This depreciation recognizes the effect on such value of the passage of time with both normal and greater than normal use.

► **Depreciation Value**—Passage of time alone is primarily associated with the element of obsolescence. This, coupled with normal use, is the determining factor upon which the primary depreciation is based. Use beyond normal, however, entails additional certain wear and tear upon the airplane in spite of adequate maintenance. Accordingly, the sponsors propose to make sure that lease payments cover "adequate" depreciation charges.

Main incentive of the plan to airlines is seen in the availability of a number of airplanes without any material initial capital investment. The lessee airline may, at its option, operate these aircraft under lease or, if it desires, purchase the aircraft immediately upon delivery.

► **Salvage Step**—Another compelling factor in the proposed plan is seen in

TWIN CITIES LOUNGE

Northwest Airlines has installed a luxurious, air conditioned international lounge at Wold-Chamberlain Field, Minneapolis, for use by passengers bound to and from the Orient and Alaska. The lounge is in the airport terminal building. Immediately adjacent to the lounge are U. S. customs, immigration, public health and agriculture offices.

the desire of Convair to find a broader market for its Convair-Liner and thus salvage the loss entailed by this program as much as possible.

The plan is designed around the Liner. The sponsors consider it wise to initiate the program with a single type and, from the experience gained in the operation, propose to gauge more accurately the industry's future requirements of other types of aircraft under the same plan.

Capital in Convair Equipment Corp. is required for two purposes: the purchase of the aircraft and spares, and provision for working capital. Capital would be in two forms, loans and common stock. Loans themselves would be divided into two groups, the first provided by the Reconstruction Finance Corp. The second, by Convair and others, would be subordinated to the RFC loans. Common stock would be purchased by Convair.

▶**Total Investment**—Assuming the purchase of 100 Convair-Liners, the price of the aircraft purchased by the Convair Equipment Corp. would be around $495,000 each. An additional $100,000 is estimated to require spares for each airplane as follows: engines and propellers, $39,000 and other spares, $61,000. On this basis, the total investment in the aircraft and spares would amount to $595,000 per airplane.

Of the total cash requirements for such purchase, the plan assumes that the RFC would provide $435,000 per plane through loans, supported by notes.

▶**Note Purchases**—The subordinated notes would be purchased by Convair, the engine and propeller manufacturers and possibly others. The common stock would be purchased by Convair at $9 per share.

The financing arrangements, reduced in terms of one plane, would take the following form: RFC loans, $435,000; subordinated loans, $131,000; common stock, $29,000.

To support 100 airplanes together with appropriate spares, it is estimated that working capital requirements with a safe margin would amount to approximately $1,235,000. This would be raised through the purchase by Convair of additional common stock of Convair Equipment Corp. at $9 per share.

Summarized, the total finances required by the equipment corporation, on the basis of 100 planes, would amount to $60,735,000. It is hoped that the RFC will supply $43,500,000 at a 4 percent interest rate. Subordinate notes held by Convair and others bearing 5 percent interest, would provide $13,100,000. Common stock held by Convair issued at $9 per share would add $4,135,000. The total number of shares of common stock outstanding would be 459,444.

Convair Equipment Corp. Sidelights . . .

Sponsors of the Convair Equipment Corp. envision a profitable operation for the company if, and it's an important "if", the plan is launched along projected lines.

- Assuming a normal utilization of eight hours per day with a 50 percent revenue passenger load factor for the firmly leased aircraft, along with emergency use of aircraft 40 percent of the time or 146 days per year, total income from such operations are estimated at $13,363,600 per year for total of 100 planes. Additional annual income from lease of spare engines and propellers would be $810,000. Projected sale of other spares would bolster annual revenues by another $1,525,000. This would bring total projected revenues to $15,698,000.
- Operating expenses are estimated at $1,700,000. Depreciation on airplanes, spare engines and propellers is placed at $9,612,000. Cost of sale of spares would add another $1,525,000 to total expenses. First year interest on loans would take $2,395,000. Total expenses amounting to $15,232,000 for the first year, would leave an estimated net before taxes of $466,600. After taxes of $178,000, net income of $288,600 would remain for the 459,444 shares of common stock, equivalent to 63 cents a share.
- As provision is made for the gradual retirement of RFC and subordinated loans, the corresponding reduction in interest charges would be reflected in the increased income available for the common stock.
- On this basis, all other factors remaining constant, net income of $585,600 or $1.27 per share would be available the second year; $862,500 or $1.88 per share the third year, $1,160,500 or $2.53 the fourth year.
- By the same token, book value of the equipment corporation's stock would increase from $9.00 per share the first year to $15.31 per share at the end of the fourth year.
- Projected leasing of aircraft by the Convair Equipment Corp. has necessitated elaborate precautions to assure adequate security for invested capital.
- More important arrangements provide that airplanes with the necessary spare engines and propellers would be delivered on a lease basis to the airline involved. As these items are individually identifiable, they would be recorded separately, forming security for the loans against them. Other spare parts and equipment, comprising a large list of items not conveniently identified separately, would be subject to basket (group) recording when segregated and protected. Recent legislation enacted by the 80th Congress permits this basket recording.
- Spare engines and propellers, as required by the airline, would also be made available subject to the same chattel mortgage recording procedure as the aircraft.

No Blanket Extension For Flight Engineers

Despite an Air Transport Association plea, the Civil Aeronautics Board will not grant a blanket extension of the order requiring employment by Dec. 1 of flight engineers on DC-6s and other aircraft certificated for more than 80,000 lb. takeoff weight.

CAB Chairman Joseph J. O'Connell, Jr., reminded Milton W. Arnold, ATA vice president in charge of operations and engineering, that the industry had notice of the Dec. 1 deadline in June, although the Board did not deny petitions for repeal of the flight engineer ruling until Oct. 5. Last summer CAB indicated concern over progress of the recruiting and training program necessary for airline compliance with the regulation.

▶**Exceptions Possible**—In his letter to ATA, O'Connell reiterated his concern and urged the carriers to expedite their flight engineer programs. He said that while no blanket extension of the Dec. 1 deadline is contemplated, sympathetic consideration will be given to requests by individual carriers for more time if the companies show they did not delay establishment of a flight engineer program after Oct. 5 and if they are now making an all-out effort.

These individual requests for deadline extension must be accompanied by a description of the flight engineer recruiting and training setup and a definite date for compliance with the regulation. Six U. S. carriers operating 109 DC-6s are immediately affected by the flight engineer provision (AVIATION WEEK, Oct. 18).

▶**American Opens Program** — United Air Lines, which has 39 DC-6s, started its flight engineer training program last summer. American airlines, with 50 DC-6s, was slated to start its first class early this month.

Meanwhile, Transocean Air Lines has announced establishment of flight engineer instruction at its Taloa Academy of Aeronautics, Oakland, Calif. Transocean said airline requests for flight engineer candidates far exceed the number of students enrolled at the Academy, and one carrier alone has entered a request for 120 of the school's graduates before next July 31.

Capital Starts Sky Coach Service

Launched with little advance public notice, in the wake of an election that could be expected to keep most people home, the first scheduled sky coach service by a domestic certificated carrier is running up a traffic record that has Capital Airlines officials glowing.

Last week, after the first seven days' operation of the 1:00 a.m. two-way New York-Pittsburgh-Chicago run, Capital pointed to these traffic figures as justification of the new service:

- Second-night increase of nearly 100 percent in number of passengers.
- Overall load factor for the seven days both ways of 72 percent (compared with system-wide load factor of approximately 55 percent).
- Advance bookings that total 400 and run into January.

Capital inaugurated its sky coach service Nov. 4, with actress Kyle MacDonell christening the Chicago-bound DC-4 "Night Hawk" with Capital President J. H. Carmichael and stewardess Dona Brower standing by (see photo). When the plane took off a few hours later 19 passengers were aboard. Coincidentally, the eastbound flight from Chicago, leaving the same time, also carried 19.

▶**Load Up**—Next morning, the westbound plane carried 37 passengers, the eastbound flight 43. By the middle of last week, the novelty showed no signs of wearing off. Westbound flight had 49 passengers ticketed for the Wednesday morning run.

New York traffic representatives of Capital say they have "never seen anything like" the advance reservations. Telephone reservations are not accepted for the Night Hawk flights; passengers must purchase tickets at Capital offices. A full refund is made on tickets cancelled up to four hours before departure time, 90 percent refund on cancellations from then to flight time, and 75 percent refund on cancellations thereafter.

Both eastbound and westbound flights stop over at Pittsburgh. Terminal to terminal elapsed time eastbound is 4 hr., 10 min., against rail time of 16 hr., 45 min. New York-Chicago sky coach fare is $29.60 against $27.30 rail coach and $44.10 Pullman.

TWA Cancels Premium Fares On Constellation

The drive to make airline travel more appealing to the average family's budget received more impetus early this month when TWA canceled the premium fare on its Constellations.

TWA's move came despite a statement by company officials little over a month before that the half-cent-a-mile surcharge on Constellations was warranted by the speedier and more luxurious service provided. American Airlines and United Air Lines removed extra fares on their DC-6s in September, leaving TWA the only transcontinental carrier with a surcharge on new equipment.

▶**Surcharges Maintained**—Eastern Air Lines still maintains a premium on Constellation flights. Braniff, Delta and National Airlines have kept their DC-6 surcharges.

TWA's Constellation service charge has been in effect since the ships were put into operation more than two years ago. Company officials say removing the extra fare is timely as an additional factor in the carrier's fall sales campaign to encourage "quickie vacation" travel to the southwest and to increase long-haul business during a normally slack traffic season.

▶**Difficult Decision**—E. O. Cocke, TWA vice president in charge of traffic, stated his company had a difficult decision to reach in discontinuing the surcharge. "But a close examination of all the facts proves we made a wise move when we did not drop the extra fare two months ago when the DC-6 fares were cut. Our revenue figures show that in September and October Connie service charges earned us approximately $350,000, equivalent to an additional 6 million passenger miles.

TWA, along with several other major carriers, still believes a fare differential should exist for different types of equipment, Cocke declared, "but it is also TWA's policy to maintain competitive fares." He also announced that TWA would withdraw its request to carry parties of ten or more persons flying from the same point of origin to the same destination at a 20 percent discount. CAB suspended the application for 90 days after two other major carriers protested, and since the group fares were intended to boost business during the winter the delay and expense involved in a hearing would make the plan impractical.

City Protests

Albuquerque, N. Mex., city commissioners have protested a reported Air Force plan to take over all of the combined Albuquerque Municipal Airport-Kirtland Field facilities. All civil aircraft, including commercial airliners, would be excluded if the move is carried through.

Wage Increase Effected

Air Line Stewards and Stewardesses Association states it has signed a contract with Continental Air Lines providing average wage increases of almost 20 percent, or about $35 monthly. The pact was reached after nearly seven months of negotiation.

Frankfurt Traffic Eased

Although some carriers will transfer operations from Frankfurt to Stuttgart this month, American Overseas Airlines will continue to fly 25 roundtrips weekly through the air corridor from Frankfurt's Rhine-Main Airport to Berlin.

Winter Seen Key to NAL Situation

Union will test ability to keep traffic low; CAB retains its investigation proposal despite many protests.

The nine-months old strike of the Air Line Pilots Association against National Airlines is entering another critical phase.

Start of the usually-lush winter traffic season will provide a severe test of the union's ability to keep NAL's load factors on the Florida vacation run at an unprofitably low point. But ALPA is prepared to meet the challenge, bolstered by the belief that the Democratic election victory has strengthened its hand greatly.

▶**Headache For Board**—Meanwhile, the Civil Aeronautics Board is developing a major headache as a result of its recently-instituted investigation to determine whether National's routes should be parceled out among other carriers. Yet, despite a torrent of criticism against the dismemberment order and the manner in which it was issued, CAB Chairman Joseph J. O'Connell, Jr., has refused to backtrack.

National's domestic load factor hit a new low of 30.9 percent in August. But traffic may bounce back since passengers riding NAL planes this fall can save money.

Despite protests of two competitors, Eastern Air Lines and Delta Air Lines, National President G. T. Baker has refused to raise his company's basic fares in accordance with CAB's recommendations of last summer. NAL would further undercut Eastern and Delta if it obtained Board approval for its proposed first-of-the-week family fare discounts.

▶**Behncke Backs Truman**—The Democratic election sweep could prove a hard blow to National. ALPA President David L. Behncke actively supported President Truman during the recent campaign.

Even before this, ALPA, through its parent organization, the American Federation of Labor, had considerable influence at the White House. Appointment of the Presidential emergency fact-finding board last May was the result of AFL pressure.

National protested the move, declaring its planes were flying and there was no emergency justifying establishment of the fact-finding panel. The carrier later refused to accept the emergency board's recommendations for settling the dispute and has indicated belief that the panel was biased.

But National was able to use the House of Representatives' labor committee as a sounding board for its position last September. Next year, if the strike continues, ALPA will have labor committees favorable to its cause in both the House and Senate.

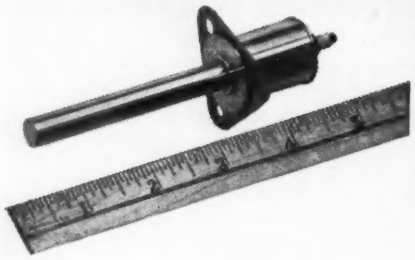
▶**Criticism Rises**—CAB is finding its position in the NAL-ALPA dispute increasingly difficult. The Board's order which opened the way to possible dismemberment of National has been criticized sharply for the confusion it generated and for its alleged political origin.

But CAB Chairman O'Connell has refused to issue a clarifying statement concerning the order despite the request of Robert Ramspeck, executive vice president of the Air Transport Association. Ramspeck said the order had "upset the morale of the employes of certificated carriers and raised doubts in the minds of investors as to the value of all route certificates."

The ATA official declared the public apparently believes CAB was asserting that it has a legal right to cancel NAL's certificates and that the only question to be considered in the investigation is to whom the National routes will be awarded.

"If this appraisal of the order is correct, I am sure you will agree no certificated carrier can hope to secure addi-

NEW THERMAL SWITCH



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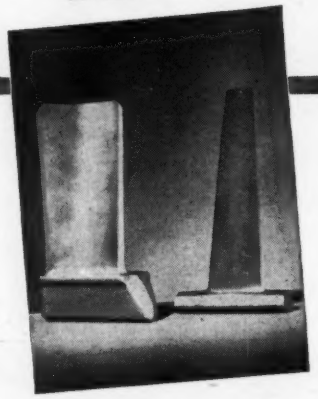

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tional money, either through equity capital or bank credits, until this matter is clarified," Ramspeck told O'Connell.

▶**O'Connell Replies**—The CAB chairman replied that the employes and investors mentioned by Ramspeck "are unduly alarmed by the order," but that the Board did not know what else it could say at the present to allay their fears. "The national order is plain that what the Board contemplates at this time is an investigation and hearing as to whether transfer of National's routes to other carriers at a fair and reasonable value would be in the public interest. No direct action looking toward the effectuation of such transfers or other amendments to the certificate is contained in the order."

O'Connell has made similar answers to senators and congressmen who have inquired about the order. He emphasized that CAB is merely carrying out its basic responsibilities for developing a sound air transportation system and correcting weaknesses in it.

▶**Probe Exploratory**—The CAB chairman told Sen. Spessard L. Holland (D., Fla.) the Board does not contemplate that any order directly requiring action by the parties concerned will be issued in the present proceeding. "The investigation is entirely exploratory in character. The Board does propose, however, upon completion of the investigation, to announce its conclusions as to whether the actions tentatively proposed are in the public interest. The Board will then determine what further action may properly be taken to have its conclusions implemented.

Before CAB makes a final decision on NAL's future it plans to give all interested groups an opportunity to present their views. The various carriers involved in the proposed route transfer, and communities affected, will be expected to present basic data to assist the Board in reaching its conclusions.

▶**Chicago & Southern Acts**—In its original order, CAB named Pan American Airways, Delta Air Lines, Eastern Air Lines and an undesignated carrier as candidates for National's various links. But Florida Airways, a feederline, Chicago & Southern Air Lines and Colonial Airlines now have asked to be included.

C&S said operation of National's route 39 (New Orleans to Jacksonville and Miami) and foreign route 32 (Miami, Tampa to Havana) by any other carrier than Chicago & Southern would mean destructive competition for C&S. CAB had suggested Delta as a logical candidate for NAL's New Orleans to Jacksonville and Miami links and either Eastern or Delta for the Miami-Havana run.

Colonial said the proposal to transfer National's New York-Miami route to Pan American would create an "un-

seemly balance" and give PAA an "unconscionable competitive advantage both domestically and with respect to foreign operations." It noted that Colonial has long been an applicant for many points which are covered by NAL's routes.

▶**Prior Decision Quoted**—While Colonial's petition did not specifically challenge CAB's authority to approve transfer of permanent air routes over the objection of the carrier holding the certificates, it did quote pointedly from a Board decision in the United-Western route transfer case last year. At that time, CAB said: "One of the gravest mistakes this Board could make would be to assume that the end justifies the means and that the Board could properly do indirectly by exertion of compulsion what it was not permitted by law to do directly. We know of no direct or indirect means available under existing law by which an air carrier can be forced against its will to transfer its property and certificate to another carrier."

CAB has received a near-record volume of protests against its NAL dismemberment investigation. One small stockholder in Tampa wrote: "I want to tell you just how badly your recent order pertaining to National Airlines 'stinks' to me." He said he was disturbed by the evidence of what he called dictatorship in government and "police state tactics."

The Greater Tampa Chamber of Commerce adopted a resolution stating: "Such action is in direct violation of long-established American principles of free enterprise and open competition. The order is high-handed and totalitarian."

▶**Pilots Attacked**—A non-stockholder resident of Miami said the Board should maintain a neutral position until the pilot strike is settled. "I have no financial interest in any airline," he said, "but when a carrier cannot fire or hire at its own discretion, the traveling public is not safe in airplanes. If this pilot strike can put one airline out of business, no other airline will dare fire pilots or mechanics it finds incapable."

From Mountainside, N. J., a non-stockholder wrote that CAB's action was "astonishing" and apparently taken under pressure from "unioneers." He said he realized that "most all airlines are political creations," but that, even so, the Board's action in this case was amazing.

▶**"Moscow Tactics"**—A former TWA airline stewardess called CAB's investigation "un-American" and said she had no sympathy with men making $800-$1500 monthly who go out on strike for no reason. A Miami Beach realtor said he disapproved of CAB's "Moscow tactics" and hated to believe that the pilot union was instrumental in causing the sudden action.

An employe of NAL's ticket office at Idlewild asked CAB what would happen to him and other workers if National is dissolved. "I wish you (the Board) all the bad luck in the world," he declared.

Even the American Legion at its recent convention urged CAB to reconsider its order on NAL dismemberment. It said the action was a threat to new enterprise. Of the many letters received by CAB, only one urged the Board to go ahead with the inquiry "despite political opposition."

TWA Shows Loss

TWA edged into the black during September, but the month's profit was insufficient to enable the carrier to show third quarter earnings.

For the three months ended Sept. 30, TWA lost $1,333,757, including $1,113,302 on domestic operations and $220,454 on its international service.

TWA's deficit for the first nine months of 1948 was $5,714,297. During the first three weeks of October, company had a profit on international operations but a loss on domestic service.

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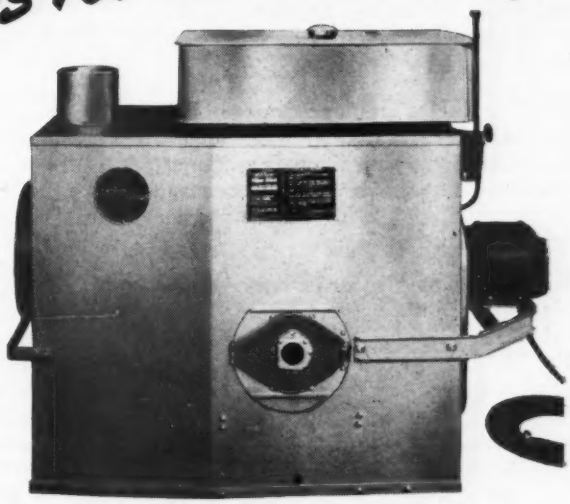

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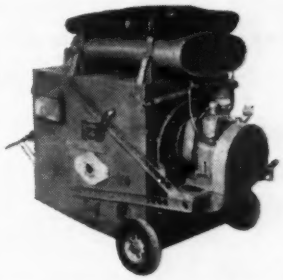

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SHORTLINES

▶ **Air Express**—Nationwide shipments numbered 2,964,115 in the first nine months of 1948, up 10.4 percent over the same 1947 period. Gross revenue was up 5.6 percent.

▶ **British Ministry of Civil Aviation**—Reports revenue traffic of BOAC, British European Airways and British South American Airways during July was a third higher than in the corresponding month last year. Passenger volume was up 28 percent, mail 23 percent and freight 62 percent.

▶ **Capital**—CAB has dismissed complaints of United Air Lines and TWA requesting suspension of Capital's sky-coach tariff between Chicago, Pittsburgh and New York.

▶ **Colonial**—Has announced a roundtrip Bermuda air-sea agreement with Holland American Steamship lines. Vacationers may travel one way by boat and one way by plane without losing the 10 percent roundtrip saving.

▶ **Independent Air Carrier Association**—Has changed its name to Non-Certificated Air Carrier Association because the first title was similar to that of another organization, the Independent Air Carrier Conference, and to one of IACC's affiliates. Composed of irregular operators using large-type transports, IACA was established last summer (AVIATION WEEK, Sept. 13), and is headed by R. R. Hart, president of Viking Airliners. Independent Air Carrier Conference is headed by Jack F. Scavenius, president of Mt. McKinley Airways, Anchorage, Alaska.

▶ **Northwest**—Crash of a NWA DC-4 near Edmonton, Canada, last month postponed the carrier's plan to institute a new cargo service and tourist-class flights between Seattle and Anchorage, Alaska. Northwest wanted to use the plane to haul cargo northbound and passengers southbound with three flights weekly, supplementing the present daily service. Passenger rates on the combination plane will be competitive with those of nonscheduled operators.

▶ **Pan American**—Flew a record 1,150,000 lb. of cargo from Seattle to Alaska during September and October. About 70 percent of the Alaska-bound cargo last month consisted of food, including fresh meat, produce and dairy products. Since the start of the West Coast maritime strike early in September, PAA has made 26 extra flights to Alaska. . . . Jerome V. Roscoe has been named division traffic manager for PAA's Atlantic Division.

▶ **Philippine Air Lines**—Dispatched an extra section all-cargo flight to Manila recently because of the Pacific maritime strike. The cargo DC-4 used for the special trip was chartered from the Flying Tiger Line.

▶ **Robinson**—Carried 2054 revenue passengers 296,800 passenger miles during its first 30 days of operation as a certified feederline.

▶ **TWA**—Flew one-fifth of all scheduled trans-Atlantic air passengers during the third quarter of 1948 and ranked first in eastbound traffic volume. The three U. S. flaglines (TWA, Pan American and American Overseas) flew 60 percent of the eastbound passenger volume in the period. Westbound, TWA handled 18 percent of all passengers flown by scheduled trans-Atlantic carriers. . . . Company has offered half-hour scenic Constellation flights over Los Angeles during weekends for $2.50 as part of a passenger promotion campaign.

▶ **Virgin Islands Air Service**—Has been ordered by CAB to cease and desist from engaging in air transportation in violation of the nonscheduled exemption. Inter-American Airways (Karl Knight) also received a cease and desist order, but suspension of the latter's letter of registration as a noncertificated irregular carrier has been lifted.

UAL Roundtrip Sales Up

United Air Lines' roundtrip ticket sales have increased almost 50 percent since the company initiated a five percent reduction on roundtrip fares September 1.

Harold Crary, UAL's vice president in charge of traffic and sales, reports 37 out of every 100 tickets bought during September were on a roundtrip basis compared to an average of 26 before the reduction went into effect. A year ago, about 25 out of every 100 customers purchased roundtrip tickets.

CAB SCHEDULE

Nov. 29—Hearing in air freight route case. (Dockets 810 et al. and 730 et al.)

Dec. 8—Hearing on Pan American Airways' Guatemala City-Los Angeles/San Francisco route case. (Docket 3277.)

Dec. 13—Hearing in TWA route consolidation case. (Docket 2581 et al.)

Dec. 15—Hearing on Board's enforcement proceeding against Transocean Air Lines. (Docket 3244.)

Jan. 3—Hearing in New England States service case. (Docket 2196 et al.)

Jan. 5—Hearing on additional service to Puerto Rico. (Docket 2123 et al.)

Jan. 10—Hearing on TWA's complaint against Seaboard & Western Airlines. (Docket 3346.)

Jan. 10—Hearing on Florida trunkline service. (Docket 2215 et al.)

Jan. 15—Hearing on Board's investigation of through service and interchange requirements at St. Louis and Memphis. (Docket 3426.)

Feb. 16—Hearing in reopened Mississippi Valley and Southeastern States cases. (Dockets 548 and 501 et al.)

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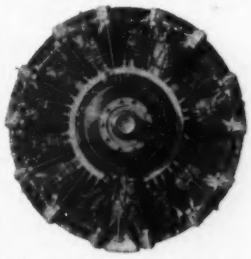

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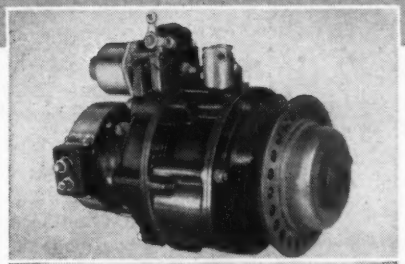

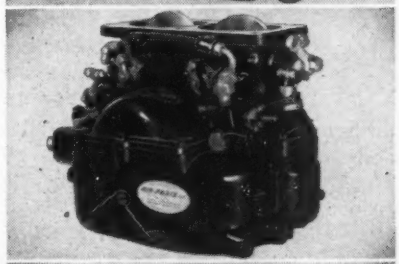

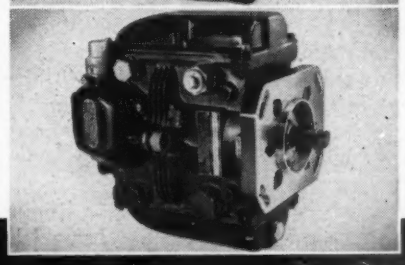

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STRICTLY PERSONAL

PURELY COINCIDENTAL—We have it from **Bill Strohmeier** that **George Galipeau** tells friends these days any similarity between his name and the Gallup poll is strictly, but strictly, coincidental. George is general sales manager of Van Dusen Aircraft Supplies.

BACK SEAT DRIVING DE LUXE—Strohmeier also reports a surplus of flight experience in Bonanza NC-3185 Victor the other day on the way to the Clinic in Detroit.

Doc Greene, of Safe Flight Indicator fame, who is the plane's owner, had 3000 hours and an instrument ticket. **Marvin Wildman,** manager of SFI, had 2500. Galipeau had 7000 and Strohmeier had 5000.

Cutting corners across Lake Erie from Cleveland to Detroit, this intrepid quartet ran smack into a very wicked and much unexpected snow squall at 8000, right over the widest stretch of water.

"Better turn back."

"Aw, we'll be through it in a minute."

"Better head for Toledo."

"Let's get back to Pelee Island."

"How about swinging over by Pelee Point?"

"Yeh, but Windsor's giving a mile and a half."

(They made Detroit and the Clinic but the Bonanza must have flown itself).

WHERE HAVE WE BEEN?—Not a day that we don't get interesting mail at AVIATION WEEK, but on Nov. 1 in comes something special—a nice note dated Oct. 28 from **Vernon Hysell,** sales manager of Jones Flying Service, Inc., at Columbus, O. It is addressed to the editor of AVIATION Magazine and it starts out:

"Dear Sir: Reference is made to your February 1940 issue which we find very interesting and worthwhile. The article on Pages 34 and 35 captioned 'Here's Where We're Going' is most interesting and commendable. May we suggest a sequel to this article dated in 1948 and captioned 'Here's Where We've Gone,' which would also be interesting and worthwhile."

If we thought Mr. Hysell didn't really know where he had been since 1940, we'd say it was the best gag letter of the year.

DAZED? SO WAS EVERYBODY ELSE—The day after the election we happened to be in Washington so checked in by phone with **Air Force Secretary Symington.** "How are you, Mr. Secretary?" he was asked.

"Dazed," he answered quickly, "happy but dazed." Like most everyone else in Washington, he had been up all night listening to the returns. A few days later a member of Congress, who had received a telegram from the Secretary congratulating the M.C. on re-election, complained about government funds being spent like that. An inquiring reporter was told Mr. Symington paid for the messages out of his own pocket.

BITS ABOUT PEOPLE—**Fred Henry,** publisher of Skyways, has bought Screenland and Silver Screen magazines from Liberty Magazine, Inc. . . . **John Cody,** with Lockheed Aircraft Corp. for eight years, has joined the Caples Co., in New York as an account executive. His most recent position had been as advertising and public relations manager for **Irish Air Lines.**

APPLAUSE FOR CAA COMMUNICATOR—**Ben Stern,** CAA information chief, calls our attention to an unsung bit of loyalty on the part of **Edward L. Ward,** a CAA aircraft communicator in Alaska. The facts just came to light in Washington, although the incident occurred in August.

A Stinson was overdue and feared disabled. Ward began a series of blind broadcasts to the aircraft advising how to detach the trailing antenna and erect a ground support for optimum radio communication.

Eventually an extremely weak carrier was heard on 3105 kc. Ward then asked that International Morse be used if possible. Came back the word "Kugururok" (a river). Heavy interference prevented further contact. Later the carrier came on again, and Ward requested a single dash be sent for affirmative, and double dash for negative. In this way the plane's position was finally fixed, local pilots found the plane and rescued three persons. Radio conditions were poor during the period. More power to men like Ward. R. H. W.

WHAT'S NEW

New Books

"The Journal of Air Law and Commerce," summer, 1948 edition, containing articles by James M. Landis, LaMotte T. Cohu and Alfred L. Wolf. Available from Northwestern University Institute of Aeronautics, 357 E. Chicago Ave., Chicago, Ill. Single copy price $1.50, one year subscription, $5.00.

"Managerial Control of Business," by the staff of the Trundle Engineering Co., a survey of management techniques. Published by John Wiley & Sons, Inc., N. Y.

"Radio Aids to Navigation," by R. A. Smith, one of a series entitled "Modern Radio Technique" by the Cambridge University Press. 114-pages, illustrated, price $2.50. Published by the Macmillan Co., 60 Fifth Ave., New York, N. Y.

"Plastics for Electrical and Radio Engineers," revised and enlarged second edition, by W. J. Tucker and R. S. Roberts. Published by the Technical Press, Ltd., London. 167-pages, illustrated.

Trade Literature

"Aluminum Alloys and Mill Products," 162-page data book with tables and explanations describing various processes. Spiral-bound, pocket-size, available from Reynolds Metals Co., 2500 South Third St., Louisville 1, Ky. No charge to engineers, designers and technical men who send request on company letterhead.

"B. F. Goodrich Adhesives," revised catalog section covering range of the company's adhesives and their application, available upon request to B. F. Goodrich Co., Akron, Ohio.

"Metal Stitching," eight-page booklet illustrating method of stitching metal and non-metal materials which replaces rivets, screws, bolts and spot welding. Free upon request to Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.

"Metco News," bimonthly publication of Metallizing Engineering Co., Inc., September issue, outlines how metallizing "can reduce the cost of maintenance of motors." Available from Metallizing Engineering Co., Inc., 38-14 30 St., Long Island City, N. Y.

"Helpful Publications on Nickel Alloys," a twelve-page booklet designed for production men, design engineers, metallurgists and users of metal. Available from International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.

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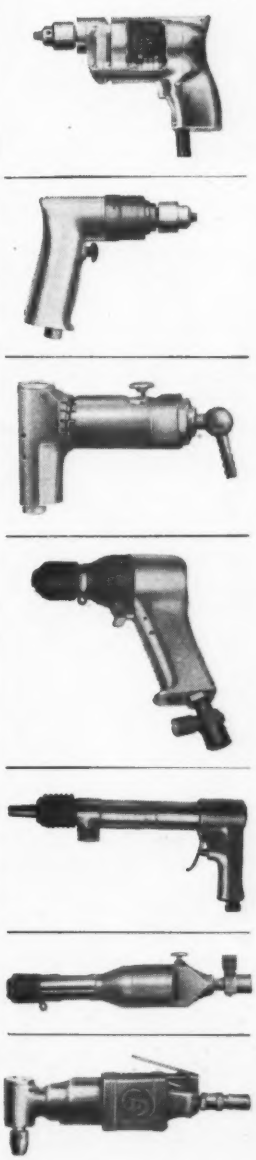

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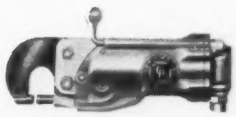
Write for Air Tools Catalog No. 564, Ninth Edition.



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EDITORIAL

Persuading Millions to Fly III

Millions of adult Americans have never flown. Yet they read daily about and take for granted the advantages air transportation offers—to others! Of course, there is a steady conversion dribble as one first rider after another climbs aboard an airliner and becomes a steady customer of the fastest means of transportation the world has ever seen.

But if a count were taken on any one day of all the first riders on U. S. commercial airliners (it would be an inexpensive and valuable research) the small number would probably shock even our airline managements.

Considering the financial plight of the airlines, it would seem that their top priority promotional objective should be to get more people into the air. Publicity is an aid, of course. So are low fares, a high safety factor, and the universally recognized attributes of regularity, on time performance, courtesy, etc.

But strangely enough, some of these operational attributes are secondary factors to the person who has still never taken his first flight. He is more concerned with getting acquainted with an airliner in an unhurried manner, without pressure of time or salesmen. He is more interested in getting a few of his own simple questions answered—and every individual has his own uncertainties. With these doubts eased he is then, and only then, mentally prepared to decide to fly.

The growing practice of conducting airport displays and selling short "sightseeing" flights satisfies these demands of most persons who have never flown.

American Airlines has conducted such valuable missionary work at Boston, Syracuse, Rochester, Baltimore, Los Angeles, Oakland, Erie, Montreal, Dallas and other cities.

"So important has this type of presentation become in the American sales scheme that it is mentioned by R. E. S. Deichler, vice president-sales, as one of the five major sales plans to be utilized by the airline in its winter sales drive," a spokesman informs AVIATION WEEK.

The company further points out that in each city some or all the methods used at the super-successful "picnic" at Westchester County Airport, New York, were utilized to draw a large crowd to the airport and to sell them on air transportation.

Westchester's party, held Saturday and Sunday, Sept. 18-19, was, American believes, "the greatest airline barnstorming and open air selling effort in the company's history."

In response to news stories and distribution of 45,000 handbills to 15 Westchester communities and adjacent Connecticut towns, a crowd estimated at 74,000 persons converged on the airport in the two days.

Free travel movies in a theater set up in the American Airlines building played continuously to packed audiences 10 hours a day. Enough bookings for advance showings were recorded from individuals in the audience to keep the New York district movie projectors busy for months to come.

The walk-through exhibits of a DC-6 Skysleeper and a DC-4 Airfreighter drew immense crowds. The freighter was loaded with such diverse items as a British Ford sedan, a DC-6 engine, lace negligees, and live fish.

Sightseeing flights along the Hudson River to the Statue of Liberty and return were the prize attraction. The demand for the $2.50 flights was so great that a DC-6, a DC-4, a DC-3, and a Convair were pressed into service. A total of 1838 persons made the flights, of which an estimated 90 percent were first riders. There were 14 Convair flights, 9 by the DC-6, 3 DC-4 flights, and 10 DC-3 trips.

The company also sold Strombeck model kits (build-it-yourself models of American Flagships) and Flagship cookies, the newest version of National Biscuit Co.'s animal crackers.

This general plan is worked in variations, according to Stan Washburn, AA promotion manager. In Syracuse, for example, a Convair was christened after inauguration of service was made the cause for an airport open house. The plane was available only part of one day. Seven thousand persons visited the airport for the christening; 2400 walked through the Convair, and 880 passengers flew on 22 sightseeing flights (at 100 percent load factor). Regretfully, the local staff turned down 500 to 700 persons who wanted to buy sightseeing tickets, because of lack of time and additional aircraft.

Although American has taken the lead in these demonstrations, the entire industry will benefit. It would seem that the entire industry could unite in a well publicized, national open house next spring during a week set aside for public education. The possibilities are impressive.

ROBERT H. WOOD

Bendix Products

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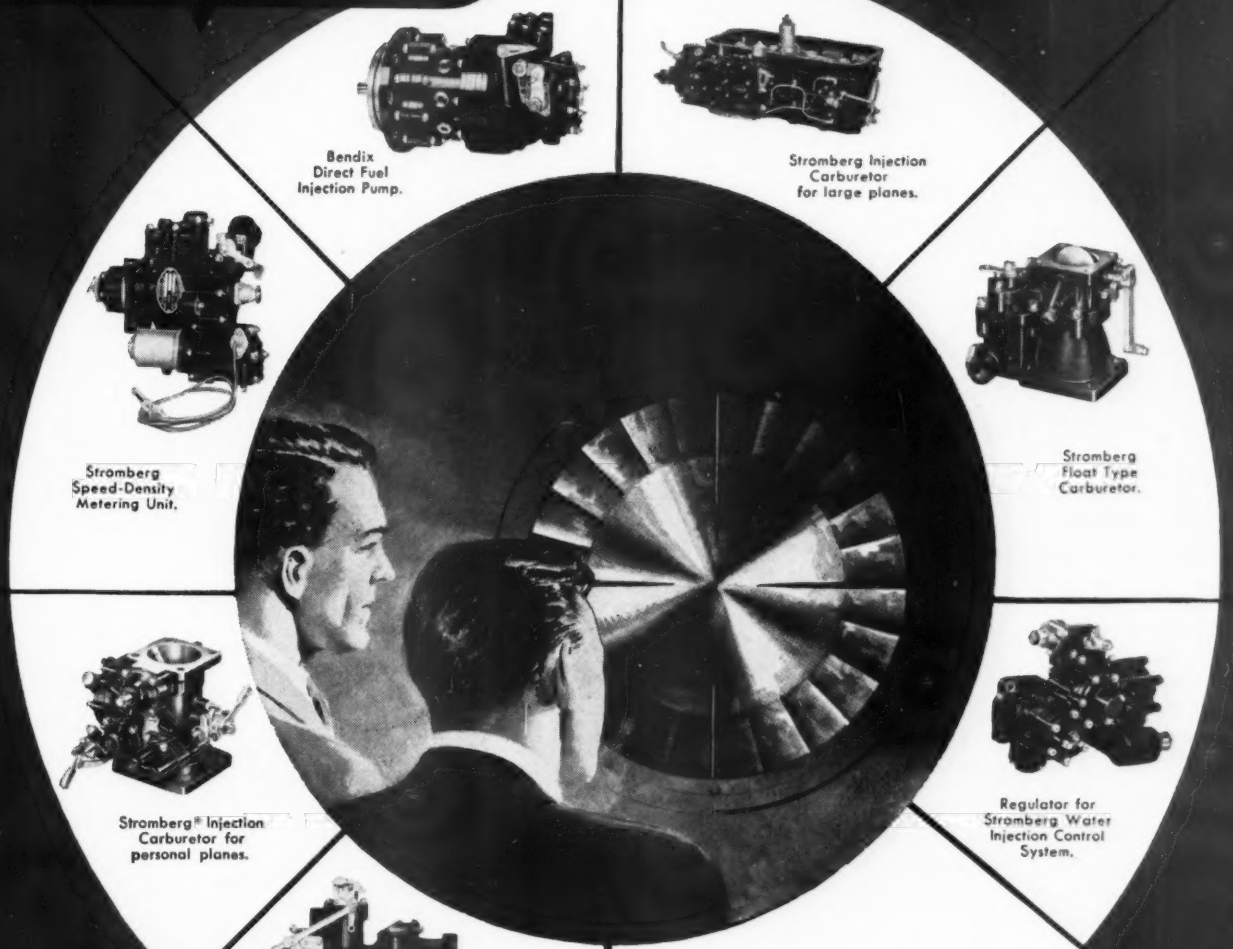

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